



## Transportation Brief 80 Marion Street, Mount Hope, ON

Paradigm Transportation Solutions Limited

January 2018



22 King Street South, Suite 300 Waterloo, ON N2J 1N8 p: 519.896.3163 905.381.2229 f: 1.855.764.7349

www.ptsl.com

3 January 2018 Project: 170310

Andrew Eldebs Development Analyst/Project Manager Branthaven Development Corp 720 Oval Court Burlington ON L7L 6A9

### RE: 80 MARION STREET, MOUNT HOPE TRANSPORTATION BRIEF

Paradigm Transportation Solutions Limited (Paradigm) has prepared this Transportation Brief for the proposed development at 80 Marion Street in Mount Hope, Ontario. Development plans entail the construction of 117 residential units with access provided through an extension of Marion Street.

Pre-study consultation with the City of Hamilton in November 2017, produced the terms of reference for this study. **Appendix A** contains correspondence regarding this process.

The scope of work for this evaluation is generally limited to the local roadway network and includes the intersections of Marion Street with Airport Road and Strathearne Place as well as Homestead Drive at Strathearne Place. This letter includes the following:

- Description of the existing roadway network in the vicinity of the site;
- Description of the proposed development program;
- Trip generation estimates for the proposed development program;
- Description of the traffic volume network development;
- Evaluation of traffic operations within the study area;
- Requirements for traffic calming measures on Marion Street; and
- Conclusions and recommendations to support the project.

### **Existing Conditions**

The development is located at the southwest corner of Spitfire Drive and Marion Street in the community of Mount Hope, Ontario. The location of the development in relation to the local roadway network is illustrated in **Figure 1 (Enclosed)**.

#### **Roadway Description**

- Airport Road is a paved two-lane roadway running east-west within the study area. Airport Road has an urban cross-section with one travel lane in each direction and a posted speed limit of 50 kilometres per hour. A continuous paved sidewalk is provided on the north side of Airport Road.
- ▶ Homestead Drive is a paved two-lane road running north-south within the study area. Homestead Drive connects directly to Upper James Street, however inbound right turn movements are permitted at the northerly connection and outbound right turn movements are permitted at the southerly connection. Homestead Drive has an urban cross-section with one through lane in each direction and an assumed speed limit of 50 kilometres per hour. There is a continuous paved sidewalk on the west side of Homestead Drive.
- Marion Street is a paved two-lane road running north-south within the study area. Marion Street has an urban cross-section and an assume speed limit of 50 kilometres per hour. There is a continuous paved walkway on the west side of Marion Street. Marion Street terminates south of Spitfire Drive and north of Aberdeen Avenue. With build out of the proposed development, Marion Street will be constructed as a through road between Airport Road and Strathearne Place. It is noted that the extension of Marion Street is consistent with the Mount Hope Secondary Plan.
- Strathearne Place is a paved two-lane roadway running east-west within the study area. Strathearne Place has a rural cross-section with one travel lane in each direction and an assumed speed limit of 50 kilometres per hour. There is no paved sidewalk on either side of Strathearne Place.

#### **Intersection Description**

The following describes the key study area intersections:

- Airport Road at Marion Street intersect to form a 3-way unsignalized intersection. Airport Road provides a single multi-use lane in both the eastbound and westbound directions. Marion Street operates as the minor street approach with stop control and a single multi-use lane in the northbound direction.
- Marion Street at Strathearne Place intersect to form a 3-way unsignalized intersection. Strathearne Place provides a single multi-use lane in both the eastbound and westbound directions. Marion Street operates as the minor street approach with stop control and a single multi-use lane in the southbound direction.
- ► Homestead Drive at Strathearne Place intersect to form a 4-way unsignalized intersection. Strathearne Place provides a single multi-use lane in both the eastbound and westbound directions. Homestead Drive provides a single multi-use lane in both the northbound and southbound directions. Strathearne Place/3359 Driveway operate as the minor street



approaches (although there is currently no stop sign for 3359 Driveway) with single multi-use lanes in eastbound and westbound directions.

### **Traffic Network**

The weekday AM and PM peak periods were used as the basis for this evaluation. Turning movement counts were collected by Pyramid Traffic Inc. at the intersections within the study area in early December 2017. Copies of the traffic volume count data are provided in **Appendix B**. The resulting 2017 Base Year traffic volumes for the weekday AM and PM peak hours are presented **Figure 2** (Enclosed).

### **Development Program**

The development parcel consists of 6.53 ha of land which is vacant. The development concept consists of 117 residential units to be built between Spitfire Drive and Aberdeen Avenue. Full build out is assumed to occur at or before 2021.

#### **Modified Road Network**

The concept plan provides for an extension of Marion Street through the development parcel resulting in a through road between Airport Road and Strathearne Place. In addition to the extension of Marion Street, Spitfire Drive will be extended to the west connecting to the Mountaingate development parcel. The provision of these roadway extensions will improve connectivity and route selection within the study area.

The proposed extension of Marion Street and Spitfire Drive through the proposed development is consistent with the Mount Hope Secondary to provide an efficient road network that will accommodate anticipated traffic volumes at a reasonable level of service while balancing the needs of all road users and vehicles.

Figure 3 (Enclosed) illustrates the preliminary site plan.



### **Trip Generation**

The rate at which any development generates traffic is dependent upon a number of factors such as size, location and concentration of surrounding developments. To estimate the volume of traffic generated by the development the ITE Trip Generation, 10th Edition<sup>1</sup> - Land Use Code (LUC) 210 - Single Family Detached has been utilized. Data for the peak hour of adjacent street traffic were used to estimated trip generation. Fitted curve equations with satisfactory R<sup>2</sup> values were applied. If no equations were available, the average rates have been applied.

In an effort to be conservative, no trip reductions to reflect increased pedestrian /cycling activity were included in the calculations. A total of 88 AM and 118 PM peak hour new vehicle trips are forecast to be added to the area roadways. **Table 1** summarizes the trip generation estimates for the weekday peak hours.

	Lloito	Tripo	AM	Peak H	lour	PM Peak Hour			
Land Use Code	Units	mps	Enter	Exit	Total	Enter	Exit	Total	
210 - Single Family Detached	117	Total <sup>a</sup>	22	66	88	74	44	118	
Total Trip Generation	117	Net New	22	66	88	74	44	118	

### TABLE 1: TRIP GENERATION SUMMARY

a Trip Generation estimate based on ITE Fitted Curve

### **Trip Distribution and Assignment**

Traffic distribution used for the purposes of this report was taken from the Mountaingate TIS. The distribution from that report was obtained from distribution patterns in the Transportation Tomorrow Survey results. The results are summarized by direction and likely route that vehicles would take to travel that direction. **Table 2** outlines the trip distribution for this study.

Direction (To/From)	Travel Route	Percent Assigned To Route
East	Airport Road	41%
West	Airport Road	39%
West	Street A	10%
South	Homestead Drive	10%
	Total	100%

### TABLE 2: TRIP DISTRIBUTION SUMMARY

Using the trip generation and trip distribution estimates, the site traffic was assigned to the road network. The assignment of site generated traffic to specific travel routes was based on observed traffic flow conditions on available routes, and the assumption that most motorists will seek the fastest



<sup>&</sup>lt;sup>1</sup> Trip Generation Tenth Edition, Institute of Transportation Engineers, Washington D.C., 2017

and most direct routes to and from the site. The weekday AM peak hour and PM peak hour site generated traffic volumes are illustrated in **Figure 4 (Enclosed).** 

### **Background and Total Growth**

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. A frequently used procedure is to estimate an annual percentage increase and apply that increase to the study area traffic volumes. An alternative procedure is to identify estimated traffic generated by specific planned major developments that would be expected to affect the project study area roadways. For the purposes of this assessment, both methods were utilized.

### Site Specific Growth

Projections from the 8521 and 8527 Airport Road  $TIS^2$  have been included in the background traffic projections. This study provides the best source for the overall development context and traffic growth expectations for the immediate study area. This report provides traffic forecast for a planning horizon of 2023 with a development assumption of  $520\pm$  residential units,  $112,000\pm$  square feet of retail space, one elementary school.

#### **General Growth**

In addition to accounting for development application in the study area, an annual growth rate of one (1) percent has been included to account for general traffic growth in the proximate area based on projections in the Airport Employment Growth District (AEGD) study<sup>3</sup>. **Figure 5 (Enclosed)** illustrates the resulting 2022 background traffic volume networks for the weekday AM and PM peak hours are presented in.

#### **Traffic Diversion**

By providing a continuous point of access from Airport Road to the Strathearne Place through Marion Street, this type of configuration may attract local neighbourhood traffic along Strathearne Place, Aberdeen Avenue and Spitfire Drive as the extension would improve connectivity to the external road network. Additionally, the extension may also attract a small amount of traffic from the intersections of Airport Road at Marion Street and Homestead Drive at Strathearne Place. However, as the extension does not provide for a shorter route/travel time for a clear majority of vehicles travelling to/from the south along Homestead Drive, a significant diversion is not anticipated. **Figure 6 (Enclosed)** illustrates the proposed diverted traffic.

#### **Future Projections**

The projected site-generated traffic volumes were added to the background and diverted traffic projections to develop the total traffic volumes. **Figure 7 (Enclosed)** illustrates the 2022 total traffic volume networks for the weekday AM and PM peak hours.



<sup>&</sup>lt;sup>2</sup> 160920: 8521 & 8527 Airport Road – Traffic Impact Study and Parking Study, Paradigm, June 2017.

<sup>&</sup>lt;sup>3</sup> Airport Employment Growth District Transportation Master Plan, City of Hamilton, June 2011.

### **Traffic Analysis**

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic within the study area. To assess quality of flow, roadway capacity analysis was conducted with respect to 2017 Base traffic conditions and projected 2022 Background and Total traffic conditions.

Level of service (LOS) is the term that defines the conditions that may occur on a given roadway or at an intersection when accommodating various traffic volume loads and were calculated based on the criteria published in the 2000 Highway Capacity Manual<sup>4</sup>. Levels of service range from A to F with LOS A representing the best vehicular operating conditions and LOS F representing the most congested. For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The level of service is only determined for left turns from the main street and all movements from the minor street.

**Table 3** summarize the capacity analyses for the study area intersections, respectively. The capacity analyses results are included in **Appendix C**. The following is noted:

- Individual movements at the unsignalized intersection of Airport Road at Marion Street currently operate at LOS B or better under the Base conditions. Similar levels of operation are expected under future Background and Total conditions with only negligible increases in delay resulting from site-generated traffic volumes.
- Individual movements at the unsignalized intersection of Marion Street at Strathearne Place currently operate at LOS A under the Base conditions. Similar levels of operation are expected under future Background and Total conditions with only negligible increases in delay resulting from site-generated traffic volumes.
- Individual movements at the all-way stop intersection of Homestead Drive at Strathearne Place currently operate at LOS A under the Base conditions. Similar levels of operation are expected under future Background and Total conditions with only negligible increases in delay resulting from site-generated traffic volumes.





#### TABLE 3: INTERSECTION CAPACITY ANALYSIS

			Base	(2017)		Ba	ckgro	und (202	22)		Total	(2022)	
Location	Movement	V/C <sup>a</sup>	Del <sup>b</sup>	LOS℃	$Q^d$	V/C <sup>a</sup>	Del <sup>b</sup>	LOS℃	$Q^d$	V/C <sup>a</sup>	Del <sup>b</sup>	LOS℃	$Q^d$
01. Airport Road at Marion Drive (TWSC)													
Weekday AM Peak Hour	WB L/T	0.00	0	А	0	0.02	1	А	0	0.03	1	А	1
	NB L/R	0.05	12	В	1	0.12	14	В	3	0.35	19	С	12
	OVERALL		1	Α			1	Α			3	Α	
Weekday PM Peak Hour	WB L/T	0.02	1	А	1	0.04	1	А	1	0.07	2	А	2
	NB L/R	0.04	12	В	1	0.09	15	В	2	0.24	18	С	7
	OVERALL		1	Α			1	Α					
02. Marion Drive at Strathearne Place (TWSC)													
Weekday AM Peak Hour	EB L/T	0.00	0	А	0	0.00	0	А	0	0.01	5	А	0
	SB L/R	0.02	9	А	0	0.02	9	А	1	0.03	9	А	1
	OVERALL						5	Α			5	Α	
Weekday PM Peak Hour	EB L/T	0.00	0	А	0	0.00	0	А	0	0.01	5	А	0
	SB L/R	0.01	9	А	0	0.01	9	А	0	0.03	9	А	0
	OVERALL		2	Α			2	Α			3	Α	
03. Homestead Drive at Strathearne Place (AWSC)													
Weekday AM Peak Hour	EB L/T/R	0.04	8	А	-	0.04	8	А	-	0.03	7	А	-
	WB L/T/R	0.00	8	А	-	0.00	8	А	-	0.00	8	А	-
	NB L/T/R	0.19	8	А	-	0.21	8	А	-	0.22	8	А	-
	SB L/T/R	0.08	8	А	-	0.09	8	А	-	0.08	8	А	-
	OVERALL		8	Α			8	Α			8	Α	
Weekday PM Peak Hour	EB L/T/R	0.03	8	А	-	0.03	8	А	0	0.03	8	А	-
	WB L/T/R	0.00	8	А	-	0.00	0	А	0	0.00	8	А	-
	NB L/T/R	0.13	8	А	-	0.15	8	А	0	0.16	8	А	-
	SB L/T/R	0.29	9	А	-	0.34	9	А	0	0.33	9	А	-
	OVERALL		8	Α			9	Α			9	Α	

a volume to capacity ratio, unless awsc where degree of utilization is summarized

b vehicle delay in seconds per vehicle

c level of service

d average queue measured in vehicles

Signal timings optimized

>120 v/c ratio exceeds 1.2; delay cannot be accurately calculated, assumed to exceed 120 seconds

# 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer

N/A Not Applicable under this scenario

TCS traffic control signal TWSC two-way stop control

AWSC all-way stop control

RBT roundabout



### Left Turn Lanes

The unsignalized intersections within the study area were assessed to determine if the projected traffic volumes warrant installation of a left turn lane along the major roadway. The warrants for left-turn lanes follow the requirements in the Ministry of Transportation's (MTO) Geometric Design Standards<sup>5</sup>. A design speed of 10 kilometres per hour over the posted speed limit and the volumes associated with the 2022 Total conditions has been utilized. The percentages of left-turning vehicles in the approaching volume were rounded to the nearest 5 percent, as nomographs are only provided for 5 percent increments. The left turn lane warrant nomographs are attached in **Appendix D**. The following is noted:

- A westbound left turn with 15 metres of storage is warranted along Airport Road at Marion Street under Background conditions. No additional storage is required under the Total conditions. Recognizing that implementation of a westbound left turn lane along Airport Road at Marion Street would be negligible in terms of operational improvements, as the westbound through movements along Airport Road is projected to operate at level of service "A" with no more than 2 seconds of delay, the City of Hamilton is recommended to review and determine the feasibility of this turn lane.
- An eastbound left turn lane is not warranted along Strathearne Place at Marion Street under the Total conditions.
- As Homestead Drive and Strathearne Place operates with all-way stop control, left-turn lane warrant analysis was not carried out as multi-use lane approaches are not recommended for all-way stop intersections.

### **Neighbourhood Cut-Through**

Speeding and cut-through traffic are possible concerns along through roadways that provide connections to major collector or arterial roadways. With the extension of Marion Street between Airport Road and Strathearne Place, a through road will be created.

#### **Marion Street Extension**

Paradigm does not anticipate the Marion Street extension to be favoured as a cut-through route for vehicles travelling south along Homestead Drive and west along Airport Road. As Marion Street currently provides for a secondary connection to Homestead Drive through Longview Drive, the current traffic volumes collected as part of this study do not reflect excessive volumes contributed to cut-through traffic. As vehicles are currently not utilizing Longview Drive to by-pass the Airport Road and Homestead Drive intersection, it is reasonable to assume that the Marion Street extension will not be utilized as a cut-through route.

To provide further validity, the projected travel times of both routes have been calculated based on uninterrupted travel time (length of route multiplied by the travel speed) and the amount of delay motorists would experience at the various intersections along the route.



<sup>&</sup>lt;sup>5</sup> TAC - Geometric Design Standards for Ontario Highways, Table 2.3.8.1 (Ratio 25:1), 2017

**Table 4** outlines the projected travel time calculations depicting the Marion Street route to be 7 second slower than the Homestead Route.

Route	Uninterrupted Travel Time	Intersection Delay	Total Time
A - Marion Street	40 Seconds <sup>a</sup>	27 Seconds <sup>c</sup>	67 Seconds
B - Homestead Drive	45 Seconds <sup>b</sup>	15 Seconds <sup>d</sup>	60 Seconds

#### TABLE 4: PROJECTED TRAVEL TIME FROM THE SOUTH

<sup>a</sup> Route A (length - 807 metres, travel speed 50 km/h)

<sup>b</sup> Route b (length - 901 metres, travel speed 50 km/h)

<sup>c</sup> 2022 Total average delay for northbound approach at Airport Road and Marion Street + 8 seconds of dealy for AWS at Marion Street and Longview Drive.

<sup>d</sup> 2023 Total average delay for northbound approach at Airport Road and Homestead Drive (8521 & 8527 Airport Road TIS)

The Marion Street extension will mostly likely be favoured by residents along Spitfire Drive, Marion Street and Strathearne Place to improve circulation to/from the external road network. As a result, traffic calming measures are not recommended at this time.

#### **Spitfire Drive Extension**

The Spitfire Drive extension through the proposed development is proposed to provide connectivity for the proposed development and the existing residential neighbourhood, rather than to provide additional access and egress capacity for development traffic. This connectivity is beneficial for a number of reasons:

- Local street connections between different areas of a neighbourhood facilitates interaction among all residents and helps foster a greater sense of community.
- ► The Spitfire Drive extension provides additional vehicle routes both for the existing neighbourhood and for the new developments. These additional vehicle routes enable traffic to distribute more evenly over the local streets and to offer greater travel convenience for residents. In this regard, the Spitfire Drive connection will benefit existing and future residents.
- Additional street connections offer greater accessibility and flexibility for emergency services to travel to all parts of the neighbourhood. For example, the Spitfire Drive connection will increase the flexibility of emergency services access to the existing neighbourhood.
- The Spitfire Drive extension will facilitate the ongoing operations of various local municipal services such as garbage pick-up, road maintenance, specialized transit vehicle routing, police patrols and other services that operate along the community streets.

It is acknowledged that there will likely be some additional traffic travelling along Spitfire Drive once the extension is constructed, this level of increase is projected to be minor and predominantly local traffic as opposed to cut-through traffic.



### Conclusions

The proposed development concept consists of constructing 117 residential units between Spitfire Drive and Aberdeen Avenue. Full build out is assumed to occur at or before 2021. The trip generation estimates indicate that 88 trips during the weekday AM peak hour and 118 trips during the weekday PM peak hour are projected.

The concept plan provides for an extension of Marion Street through the development parcel providing a through road between Airport Road and Strathearne Place. In addition to the extension of Marion Street, Spitfire Drive will be extended to the west connecting to the Mountaingate development parcel. The provision of these extensions will improve connectivity and route selection for local residents as opposed to being favoured as a cut-through route given travel time benefits are not realized through the extensions.

Detailed traffic analysis was conducted for each of the study area intersections under 2017 Base traffic conditions and 2022 Background and Total conditions. The capacity analysis showed that the study area intersections are not expected to experience significant impacts to operations as a result of the development program.

While no capacity issues are projected at the intersection of Airport Road and Marion Street, a westbound left turn lane with 15 metres of storage is warranted under the 2022 Background conditions. The proposed development does not trigger the need for this turn lane or any additional storage requirements. Recognizing that the need for this improvement is related to existing and broader area development traffic, the requirement for this turn lane is not the applicant's responsibility nor should the requirement for this turn lane form any condition of draft plan of subdivision approval.

Overall, the study finds that site generated traffic will not have a significant impact on traffic operations within the study area and the existing transportation infrastructure in the area can adequately accommodate the traffic volumes projected to be generated by the proposed development.

We trust that the foregoing information will meet your requirements. Please do not hesitate to contact us if we can be of further assistance.

Yours very truly,

### PARADIGM TRANSPORTATION SOLUTIONS LIMITED

**Stew Elkins** B.E.S., MITE Vice-President



### **ATTACHMENTS**







80 Marion Street, Mount Hope – Transportation Brief 170310

paradigm TRANSPORTATION SOLUTIONS





Base Year Peak Hour Traffic Volumes

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## Site Plan Figure 3

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Site Generated Peak Hour Traffic Volumes

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2022 Background Peak Hour Traffic Volumes

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Projected Diverted Traffic

80 Marion Street, Mount Hope – Transportation Brief 170310



**2022 Total Peak Hour Traffic Volumes** 





From: Lucas, Sandra [mailto:Sandra.Lucas@hamilton.ca]
Sent: Thursday, November 9, 2017 11:16 AM
To: Andrew Eldebs <aeldebs@branthaven.com>
Cc: Decleir, Robert <<u>Robert.Decleir@hamilton.ca</u>>; Rybensky, Yvette <<u>Yvette.Rybensky@hamilton.ca</u>>; Harrison-McMillan, Kimberley <<u>Kimberley.Harrison-McMillan@hamilton.ca</u>>
Subject: RE: Branthaven Mount Hope TIS Scope (80 Marion Drive, FC-16-084) Transportation Planning Services (formerly Corridor Management)

Good morning Andrew,

I received you phone message yesterday regarding possible reduction of TIS scope for the subject site. Thank you for the follow up e-mail clarifying your request.

I was not aware there had been conversations to reduce scope for the TIS. Typically these would have taken place between Transportation Planning Services (formerly Corridor Management), the developer and traffic consultant. Based on our original oversight requiring a TIS, I understand you wish to expedite this and can offer a reduction in scope.

A Traffic Impact Brief will be sufficient for this application. This brief is to measure existing & estimated future totals traffic volumes generated from the new development. It must also identify any traffic improvements (i.e. traffic control devices, additional lanes, etc.) required on the affected municipal roadways. It can have a limited study area and only 1-year Horizon year will be necessary from full build out of the site. The brief must be submitted in hardcopy and digital format.

Mainly, our interest is how the Marion Street completion will affect traffic patterns such as:

- 1) Requirements for traffic calming measures on Marion?
- 2) Potential traffic control changes at Airport and Marion; Marion and Strathearne; Strathearne and Homestead
- 3) Other potential scenarios

I trust this helps.

#### Sandra Lucas

Traffic Planning Technologist Transportation Planning Services Public Works Department 77 James Street North, Suite 400

Tel: 905-546-2424 ext 4575 Email: <u>Sandra.Lucas@Hamilton.ca</u>



www.hamilton.ca/canada150

From: Andrew Eldebs [mailto:aeldebs@branthaven.com]
Sent: November-08-17 2:26 PM
To: Harrison-McMillan, Kimberley; Lucas, Sandra
Cc: Decleir, Robert; Rybensky, Yvette







Weather conditions: Clear/Dry Person(s) who counted: Cam									
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Airport Rd									
Cars Trucks Heavys Totals 1054 13 38 1105									
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ients									

Marion St @ Strathearne Pl											
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** Non-Signalized Inters	ection **		Major Roa	d: Stra	athearne	Pl runs	W/E				
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Strathearne PI Cars Trucks Heavys Totals 90 0 1 91
<b>b</b>
E









Lane Group         EBT         EBR         WBL         WBL         NBR           Lane Configurations         -			~	/	+	*	*	
Lane Configurations         EBR         WBL         WBL         NBR           Lane Configurations         Image: Config		-				7	1	
Lane Configurations 178 9 1 308 17 13 Traffic Volume (vph) 178 9 1 308 17 13 Ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 Lane Ulti. Factor 1.00 1.00 1.00 1.00 1.00 1.00 Ped Bike Factor Frt 0.993 0.941 Fit Proteted 0.973 Satd. Flow (prot) 1828 0 0 1830 1646 0 Link Speed (kh) 50 50 50 Link Distance (m) 242.7 264.6 98.7 Travel Time (s) 17.5 19.1 7.1 Confl. Peds. (#hr) 8 8 8 3 Peak Hour Factor 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 4% 11% 0% 5% 6% 8% Adj. Flow (vph) 193 10 1 335 18 14 Shared Lane Traffic (%) Lane Group Flow (vph) 203 0 0 336 32 0 Enter Biocked Intersection No No No No No No Lane Alignment Left Right Left Left Left Right Median Width(m) 0.0 0.0 3.7 Link Ofsetor 0.99 0.99 0.99 0.99 0.99 Two way Left Turn Lane Headway Factor 0.99 0.99 0.99 0.99 0.99 Intersection Summary Headway Factor 0.99 0.99 0.99 0.99 0.99 Link Ofsetor 0.90 0.99 0.99 0.99 Two way Left Turn Lane Headway Factor 0.99 0.99 0.99 0.99 0.99 Intersection Summary Trave Time (b) 14 24 24 14 Sign Control Free Free Stop Intersection Capacity Ultization 27.0% ICU Level of Service A	Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Traffic Volume (vph)       178       9       1       308       17       13         Future Volume (vph)       178       9       1       308       17       13         Ideal Flow (vph)       1900       1900       1900       1900       1900       1900         Lane Util. Factor       1.00       1.00       1.00       1.00       1.00       1.00         Ped Bike Factor        0.973       .       0.941         Fit Protected       0.973       .       0.973         Satd. Flow (pern)       1828       0       0       1830       1646       0         Link Speed (k/h)       50       50       50       50       50       50         Link Speed (k/h)       50       50       50       50       50       50         Confl. Peds. (#/hr)       8       8       3       .       .       .         Confl. Peds. (#/hr)       8       8       3       .       .       .         Adj. Flow (pth)       133       1       1       335       14       .         Shared Lane Traffic (%)       23       0       0       3.7       .       .         La	Lane Configurations	4				Y.		
Future Volume (vph)         178         9         1         308         17         13           ideal Flow (vphpl)         1900         1900         1900         1900         1900         1900           Lane Util, Factor         1.00         1.00         1.00         1.00         1.00         1.00           Ped Bike Factor         0.973         0.941         0.973         0.973           Sald, Flow (port)         1828         0         0         1830         1646         0           Link Speed (k/h)         50         50         50         1.11         1.11         1.11         1.11         1.11           Peak Hour Factor         0.92         0.92         0.92         0.92         0.92         1.11	Traffic Volume (vph)	178	9	1	308	17	13	
Ideal Flow (vphpl)         1900         1900         1900         1900           Lane Util. Factor         1.00         1.00         1.00         1.00         1.00           Ped Bike Factor         0.993         0.941         0.973         0.973           Satd. Flow (prol)         1828         0         1830         1646         0           Filt Protected         0.973         0.973         0.973         0.973           Satd. Flow (porn)         1828         0         0         1830         1646         0           Link Speed (k/h)         50         50         50         50         50         50           Link Distance (m)         242.7         264.6         98.7         7         7           Confl. Peds. (#/hr)         8         8         3         3         3           Peak Hour Factor         0.92         0.92         0.92         0.92         0.92           Heavy Vehicles (%)         4%         11%         0%         5%         6%         8%           Adj. Flow (vph)         193         10         1         335         18         14           Shared Lane Traffic (%)         Lane Alignment         Left         Lef	Future Volume (vph)	178	9	1	308	17	13	
Lane Ulii, Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Ped Bike Factor Fit 0.993 0.941 Satd. Flow (port) 1828 0 0 1830 1646 0 U973 Satd. Flow (perm) 1828 0 0 1830 1646 0 Link Speed (k/h) 50 50 50 Link Distance (m) 242.7 264.6 98.7 Travel Time (s) 17.5 19.1 7.1 Confl. Peds. (#/hr) 8 8 8 3 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 Heavy Vehicles (%) 4% 11% 0% 5% 6% 8% Adj. Flow (pph) 193 10 1 335 18 14 Shared Lane Traffic (%) Lane Group Flow (pph) 203 0 0 336 32 0 Enter Blocked Intersection No No No No No Lane Alignment Left Right Left Left Left Right Median Width(m) 0.0 0.0 3.7 Link Offset(m) 0.0 0.0 Crosswalk Width(m) 4.9 4.9 Two way Left Turn Lane Headway Factor 0.99 0.99 0.99 0.99 0.99 Two way Left Turn Lane Headway Factor 0.99 0.99 0.99 0.99 0.99 Intersection Summary Area Type: Other Control Type: Unsignalized Intersection Capacity Uliization 27.0% ICU Level of Service A	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Ped Bike Factor         Frt       0.993       0.941         FIL Protected       0.973         Satd. Flow (prot)       1828       0       0       1830       1646       0         FIL Permitted       0.973       0.973       0.973       0.973       0.973       0.973         Satd. Flow (prot)       1828       0       0       1830       1646       0       0       0.973       0.974       0.974       0.974       0.974       0.975       0.971       0.071       0.971       0.971       0.971       0.971       0.971       0.971       0.972       0.922       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.92       0.93       0.93       0	Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt       0.993       0.941         FIP Protected       0.973         Satd. Flow (port)       1828       0       0       1830       1646       0         FIP Permitted       0.973       0.973       0.973       0.973       0.973         Satd. Flow (perm)       1828       0       0       1830       1646       0         Link Speed (kfn)       50       50       50       50       50       50         Travel Time (s)       17.5       19.1       7.1       7.1       50       50       50         Confi. Peds. (#Int)       8       8       3       3       36       32       0       0.92       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.93       0.94       0.94       9       0.94       9	Ped Bike Factor							
Fit Protected       0.973         Said. Flow (prot)       1828       0       0       1830       1646       0         Fit Permitted       0.973       0.973       0.973       0.973       0.973         Said. Flow (perm)       1828       0       0       1830       1646       0         Link Speed (k/h)       50       50       50       50       50       50         Travel Time (s)       17.5       19.1       7.1       7.1       50       50         Confl. Peds. (#/hr)       8       8       3       7.1       50       50         Heary Vehicles (%)       4%       11%       0%       5%       6%       8%         Adj. Flow (ph)       193       10       1       335       18       14         Shared Lane Traffic (%)       11       335       18       14       14         Shared Lane Traffic (%)       203       0       0       3.6       32       0         Lane Alignment       Left       Right       Left       Left       Right       Left       It wit wit wit wit wit wit wit wit wit wi	Frt	0.993				0.941		
Satd. Flow (prot)       1828       0       0       1830       1646       0         FIt Permitted       0.973       0       1830       1646       0         Satd. Flow (perm)       1828       0       0       1830       1646       0         Link Speed (k/h)       50       50       50       50       50         Link Distance (m)       242.7       264.6       98.7       7.1         Confl. Peds. (#/hr)       8       8       3         Peak Hour Factor       0.92       0.92       0.92       0.92         Heavy Vehicles (%)       4%       11%       0%       5%       6%       8%         Adj. Flow (vpth)       10       1       335       18       14         Shared Lane Traffic (%)       30       0       336       32       0         Lane Group Flow (vpth)       203       0       0.036       32       0         Lane Alignment       Left       Right       Left       Left       Right         Median Width(m)       0.0       0.0       3.7       1.9       1.9         Trow ay Left Turn Lane       -       -       4.9       4.9       1.4	Flt Protected					0.973		
Fit Permitted       0.973         Sald. Flow (perm)       1828       0       0       1830       1646       0         Link Speed (k/h)       50       50       50       50       50       50         Link Distance (m)       242.7       264.6       98.7       7.1       7.1       7.1         Confl. Peds. (#/hr)       8       8       3       7.2       7.1       7.1       7.1         Peak Hour Factor       0.92       0.92       0.92       0.92       0.92       9.2       9.2         Heavy Vehicles (%)       4%       11%       0%       5%       6%       8%         Adj. Flow (vph)       193       10       1       335       18       14         Shared Lane Traffic (%)       Lane Group Flow (vph)       203       0       0       336       32       0         Enter Blocked Intersection       No       No       No       No       No       No       No         Lane Alignment       Left       Right       Left       Left       Right       Headway Factor       0.99       0.99       0.99       0.99       10.91       10       10       10       10       10       10       10	Satd. Flow (prot)	1828	0	0	1830	1646	0	
Satd. Flow (perm)         1828         0         0         1830         1646         0           Link Speed (k/h)         50	Flt Permitted					0.973		
Link Speed (k/h)       50       50       50         Link Distance (m)       242.7       264.6       98.7         Travel Time (s)       17.5       19.1       7.1         Confl. Peds. (#/hr)       8       8       3         Peak Hour Factor       0.92       0.92       0.92       0.92         Heavy Vehicles (%)       4%       11%       0%       5%       6%       8%         AdJ, Flow (rph)       10       1       335       18       14         Shared Lane Traffic (%)       Lane Group Flow (rph)       203       0       0       336       32       0         Enter Blocked Intersection       No       No       No       No       No       No       No         Median Width(m)       0.0       0.0       3.7       Link Offset(m)       0.0       0.0         Conswalk Width(m)       4.9       4.9       4.9       4.9       14       Yes (Phi)	Satd. Flow (perm)	1828	0	0	1830	1646	0	
Link Distance (m)         242.7         264.6         98.7           Travel Time (s)         17.5         19.1         7.1           Confl. Peds. (#/hr)         8         8         3           Peak Hour Factor         0.92         0.92         0.92         0.92           Peak Hour Factor         0.92         0.92         0.92         0.92           Heavy Vehicles (%)         4%         11%         0%         5%         6%         8%           Adj. Flow (vph)         193         10         1         335         18         14           Shared Lane Traffic (%)	Link Speed (k/h)	50			50	50		
Travel Time (s)       17.5       19.1       7.1         Confl. Peds. (#hr)       8       8       3         Peak Hour Factor       0.92       0.92       0.92       0.92         Heavy Vehicles (%)       4%       11%       0%       5%       6%       8%         Adj. Flow (vph)       193       10       1       335       18       14         Shared Lane Traffic (%)       Lane Group Flow (vph)       203       0       0       336       32       0         Enter Blocked Intersection       No       No       No       No       No       No         Median Width(m)       0.0       0.0       3.7            Link Offset(Im)       4.9       4.9       4.9            Traved Y Edit Cor       0.99       0.99       0.99       0.99       0.99          Umind Speed (kh)       14       24       24       14           Sign Control       Free       Free       Stop            Intersection Summary            <	Link Distance (m)	242.7			264.6	98.7		
Confl. Peds. (#/hr)         8         8         3           Peak Hour Factor         0.92         0.92         0.92         0.92         0.92           Peak Vehicles (%)         4%         11%         0%         5%         6%         8%           Adj. Flow (vph)         193         10         1         335         18         14           Shared Lane Traffic (%)                 Lane Group Flow (vph)         203         0         0         336         32         0           Enter Blocked Intersection         No         No         No         No         No         No           Lane Alignment         Left         Right         Left         Left         Right         Left         Left         No         No           Link Offse(rm)         0.0         0.0         3.7	Travel Time (s)	17.5			19.1	7.1		
Deak Hour Factor         0.92         0.92         0.92         0.92         0.92           Heavy Vehicles (%)         4%         11%         0%         5%         6%         8%           Adj. Flow (vph)         193         10         1         335         18         14           Shared Lane Traffic (%)	Confl. Peds. (#/hr)		8	8		3		
Heavy Vehicles (%)       4%       11%       0%       5%       6%       8%         Adj. Flow (vph)       193       10       1       335       18       14         Shared Lane Traffic (%)       Lane Group Flow (vph)       203       0       0       336       32       0         Enter Blocked Intersection       No       No       No       No       No       No         Lane Alignment       Left       Right       Left       Left       Right         Median Width(m)       0.0       0.0       3.7       1110000000000000000000000000000000000	Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)       193       10       1       335       18       14         Shared Lane Traffic (%)	Heavy Vehicles (%)	4%	11%	0%	5%	6%	8%	
Shared Lane Traffic (%)           Lane Group Flow (vph)         203         0         336         32         0           Enter Blocked Intersection         No         No         No         No         No           Lane Alignment         Left         Right         Left         Left         Right           Median Width(m)         0.0         0.0         3.7	Adj. Flow (vph)	193	10	1	335	18	14	
Lane Group Flow (vph)         203         0         0         336         32         0           Enter Blocked Intersection         No         No         No         No         No           Lane Alignment         Left         Right         Left         Left         Right           Vedian Widh(m)         0.0         0.0         3.7             Link Offset(m)         0.0         0.0         0.0             Vidth(m)         4.9         4.9         4.9             Iwo way Left Turn Lane	Shared Lane Traffic (%)							
Enter Blocked Intersection         No         Ana         Alignment         Left         Right         Left         Left <thleft< th="">         Left         Left         <th< td=""><td>ane Group Flow (vph)</td><td>203</td><td>0</td><td>0</td><td>336</td><td>32</td><td>0</td><td></td></th<></thleft<>	ane Group Flow (vph)	203	0	0	336	32	0	
Left         Right         Left         Left         Left         Right           Vedian         Width(m)         0.0         0.0         3.7           Jink Offset(m)         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9           Two way Left Turn Lane         -         -         -           Veradway Factor         0.99         0.99         0.99         0.99           Turning Speed (k/h)         14         24         24         14           Sign Control         Free         Free         Stop           Area Type:         Other         -         -           Control Type:         Other         -         -           Intersection Capacity Utilization 27.0%         ICU Level of Service A         -	Enter Blocked Intersection	No	No	No	No	No	No	
Median Ŵidth(m)         0.0         3.7           Link Offset(m)         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9           Ivo way Left Turn Lane	Lane Alignment	Left	Right	Left	Left	Left	Right	
Link Offset(m)         0.0         0.0         0.0           Crosswalk Width(m)         4.9         4.9         4.9           Two way Left Turn Lane	Median Width(m)	0.0	J .		0.0	3.7		
Crosswalk Width(m)         4.9         4.9           Two way Left Turn Lane	Link Offset(m)	0.0			0.0	0.0		
Two way Left Turn Lane         Headway Factor         0.99         0.99         0.99         0.99         0.99           Turning Speed (k/h)         14         24         24         14           Sign Control         Free         Free         Stop           Intersection Summary         Area Type:         Other           Control Type: Unsignalized         Intersection Capacity Utilization 27.0%         ICU Level of Service A	Crosswalk Width(m)	4.9			4.9	4.9		
Headway Factor         0.99         0.99         0.99         0.99           Turning Speed (k/h)         14         24         24         14           Sign Control         Free         Free         Stop           Intersection Summary         Area Type:         Other           Control Type: Unsignalized         Intersection Capacity Utilization 27.0%         ICU Level of Service A	Two way Left Turn Lane							
Turning Speed (k/h)         14         24         24         14           Sign Control         Free         Free         Stop           Intersection Summary         Pree         Stop           Area Type:         Other         Other           Control Type: Unsignalized         Intersection Capacity Utilization 27.0%         ICU Level of Service A	Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Sign Control Free Free Stop Intersection Summary Area Type: Other Control Type: Unsignalized Intersection Capacity Utilization 27.0% ICU Level of Service A	Turning Speed (k/h)		14	24		24	14	
Intersection Summary Other Control Type: Unsignalized Intersection Capacity Utilization 27.0% ICU Level of Service A	Sian Control	Free			Free	Stop		
Intersection Summary Area Type: Other Control Type: Unsignalized Intersection Capacity Utilization 27.0% ICU Level of Service A								
Area Type: Uther Control Type: Unsignalized Intersection Capacity Utilization 27.0% ICU Level of Service A	Intersection Summary							
Control Type: Unsignalized Intersection Capacity Utilization 27.0% ICU Level of Service A	Area Type: (	Uther						
Intersection Capacity Utilization 27.0% ICU Level of Service A	Control Type: Unsignalized							
	Intersection Capacity Utilizat	tion 27.0%			IC	CU Level (	of Service A	1

HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road Base Year AM Peak Hour.syn 12/07/2017

Intervenent         EBT         EBR         WBL         WBT         NBL         NBR           ane Configurations         1         308         17         13           traffic Volume (veh/h)         178         9         1         308         17         13           ign Control         Free         Stop         0%         0%         0%         0%           ign Control         Free         Stop         0.92		-	$\mathbf{r}$	4	+	•	1	
ane Configurations       i	Movement	EBT	EBR	WBL	WBT	NBL	NBR	
raffic Volume (veh/h)       178       9       1       308       17       13         uture Volume (Veh/h)       178       9       1       308       17       13         ign Control       Free       Free       Stop       0%       0%       0%         ign Control       Off       092       0.	Lane Configurations	ĥ			ર્શ	Y		
uture Volume (Veh/h) 178 9 1 308 17 13  ign Control Free Free Stop irade 0% 0% 0% eak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	Traffic Volume (veh/h)	178	9	1	308	17	13	
lign Control         Free         Free         Stop           irade         0%         0%         0%         0%           eak Hour Factor         0.92         0.92         0.92         0.92         0.92           lourly flow rate (vph)         193         10         1         335         18         14           edestrians         3         8         ane         ane         11         1.1           tedestrians         3.7         3.7         JAIking Speed (m/s)         1.1         1.1           terrent Blockage         0         1         1.1         1.1         terrent Blockage         0         1           tight turn flare (veh)         tedian type         None         None         tedian type         tedian type         tedian type         Conflicting volume         211         546         206         Cot	Future Volume (Veh/h)	178	9	1	308	17	13	
Trade         0%         0%         0%         0%           eak Hour Factor         0.92         0.6 <td< td=""><td>Sign Control</td><td>Free</td><td></td><td></td><td>Free</td><td>Stop</td><td></td><td></td></td<>	Sign Control	Free			Free	Stop		
leak Hour Factor         0.92         0.92         0.92         0.92         0.92         0.92           lourly flow rate (vph)         193         10         1         335         18         14           edestrians         3         8         3         8         3         8           ane Width (m)         3.7         3.7         3.7         3.7         3.7           Valking Speed (m/s)         1.1         1.1         1.1         1.1           tercent Blockage         0         1         1.1         1.1           tercent Blockage         0         1         1.5         1.5           tedian type         None         None         None         None           fedian tstorage veh)         Vextor Mark         X, platoon unblocked         Z, stage 2 conf vol         Stage (s)         Z, stage 2 conf vol         Z, stage 2 conf vol         Z, stage 2 conf vol         Stage 2 conf vol         Z, st	Grade	0%			0%	0%		
loury flow rate (vph)         193         10         1         335         18         14           edestrians         3         8         8         8         8         8           ane Width (m)         3.7         3.7         10         1         11	Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
edestrians         3         8           ane Width (m)         3.7         3.7           ane Width (m)         3.7         3.7           ane Width (m)         3.7         3.7           alking Speed (m/s)         1.1         1.1           ercent Blockage         0         1           tedian type         None         None           ledian storage veh)         Image: Speed (m/s)         Image: Speed (m/s)           lpstream signal (m)         X, platoon unblocked         C, conflicting volume         211         546         206           C1, stage 1 conf vol         211         546         206         C1, stage 2 conf vol         Cu, unblocked vol         211         546         206           C2, stage 2 conf vol         22         3.6         3.4         O         Get and the second	Hourly flow rate (vph)	193	10	1	335	18	14	
ane Width (m) 3.7 3.7 Valking Speed (m/s) 1.1 1.1 tercent Blockage 0 1 Itercent Blockage 0 1 Valking Speed (m/s) 1.1 1.1 tercent Blockage 0 1 Itercent Blockage 0 1 Valking Valking Val	Pedestrians	3				8		
Valking Speed (m/s) 1.1 1.1 ercent Blockage 0 1 tight furn flare (veh) ledian type None None ledian storage veh) lpstream signal (m) X, platoon unblocked C, conflicting volume 211 546 206 C1, stage 1 conf vol C2, stage 2 conf vol C2, stage 2 conf vol C2, stage 2 conf vol C2, stage 3 conf vol C2, stage 3 conf vol C2, stage 3 conf vol C3, stage 3 conf vol C3, stage 4 conf vol C3, stage 4 conf vol C3, stage 5 conf vol C3, stage 5 conf vol C4, stage 5 conf vol C2, stage 5 conf vol C3, stage 6 conf vol C3, stage 6 conf vol C4, stage 7 conf vol C3, stage 6 conf vol C4, stage 1 conf vol C2, stage 6 conf vol C3, stage 6 conf vol C4, stage 7 conf vol C4, stage 7 conf vol C4, stage 1 conf vol C2, stage 7 conf vol C4, stage 1 conf vol C2, stage 7 conf vol C2, stage 8 conf vol C3, stage 8 conf vol C4, stage 7 conf vol C4,	Lane Width (m)	3.7				3.7		
ercent Blockage       0       1         tight turn flare (veh)       None       None         tedian storage veh)       None       None         pstream signal (m)       X, platoon unblocked       C, conflicting volume       211       546       206         C1, stage 1 conf vol       C2, stage 2 conf vol       Cu, unblocked vol       211       546       206         C2, stage 2 conf vol       Cu, unblocked vol       211       546       206         C, single (s)       4.1       6.5       6.3         Z, stage (s)       2.2       3.6       3.4       O queue free %       100       96       98         M capacity (veh/h)       1361       486       813       100       96       98         Irection, Lane #       EB 1       WB 1       NB 1       100       96       98         Olume Left       0       1       18       100       94       54       100       10       13       100       14       54       100       13       100       14       54       100       11       10       13       10       13       10       13       10       13       10       13       10       13       10 <td< td=""><td>Walking Speed (m/s)</td><td>1.1</td><td></td><td></td><td></td><td>1.1</td><td></td><td></td></td<>	Walking Speed (m/s)	1.1				1.1		
tight turn flare (veh)         None         None           ledian storage veh)         storage veh)         storage veh)           spirream signal (m)         X         platoon unblocked           C, conflicting volume         211         546         206           C1, stage 1 conf vol         211         546         206           C1, stage 2 conf vol         211         546         206           C2, stage 2 conf vol         211         546         206           C3, stage 1 conf vol         211         546         206           C2, stage 2 conf vol         211         546         206           C3, stage 1 conf vol         211         546         206           C2, stage 2 conf vol         201         546         206           C2, stage 2 conf vol         211         546         206           C2, stage (s)         5         2.2         3.6         3.4           0 queue free %         100         96         98           M capacity (veh/h)         1361         486         813           vircetion, Lane #         EB 1         WB 1         NB 1           Olume Total         203         336         32           Olume Total	Percent Blockage	0				1		
None         None           Iedian type         None           Iedian type         None           Iedian type         None           Iedian tstorage veh)         Istream signal (m)           Ipstream signal (m)         X, platoon unblocked           C, conflicting volume         211         546         206           C1, stage 1 conf vol         2         2         3         6.3           C2, stage 2 conf vol         211         546         206         2.           C2, stage 2 conf vol         211         546         206         2.         3.4         0           C, 2 stage (s)         - <td>Right turn flare (veh)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Right turn flare (veh)							
Iedian sforage veh)         pstream signal (m)         X, platoon unblocked         C, conflicting volume       211       546       206         C1, stage 1 conf vol         C2, stage 2 conf vol       Cu, unblocked vol       211       546       206         C, unblocked vol       211       546       206       206         C, stage 1 conf vol       Cu, unblocked vol       211       546       206         C, unblocked vol       211       546       206       206         C, stage (s)       4.1       6.5       6.3       6.3         C (s)       2.2       3.6       3.4       0         O queue free %       100       96       98         M capacity (veh/h)       1361       486       813         Virection, Lane #       EB 1       WB 1       NB 1         folume Left       0       1       18         folume Right       10       0       14         SH       1700       1361       590         folume Legt by 5th (m)       0.0       0.0       1.3         control Delay (s)       0.0       0.0       1.5         pproach Delay (s)       0.0       0.0	Median type	None			None			
Ipstream signal (m) X, platoon unblocked C, conflicting volume 211 546 206 C1, stage 1 conf vol C2, stage 2 conf vol C2, stage 2 conf vol C2, stage 2 conf vol C2, single (s) 4.1 6.5 6.3 2, 2 stage (s) F (s) 2.2 3.6 3.4 0 queue free % 100 96 98 M capacity (veh/h) 1361 486 813 Irrection, Lane # EB 1 WB 1 NB 1 Olume Total 203 336 32 Volume Left 0 1 18 Olume Left 0 1 18 Olume Right 10 0 14 SH 1700 1361 590 Olume Locapacity 0.12 0.00 0.05 Iueue Length 95th (m) 0.0 0.0 11.3 Shorticol Delay (s) 0.0 0.0 11.5 pproach Delay (	Median storage veh)							
X, platoon unblocked         C, conflicting volume       211       546       206         C1, stage 1 conf vol       211       546       206         C2, stage 2 conf vol       211       546       206         C3, stage 1 conf vol       211       546       206         C3, stage 1 conf vol       211       546       206         C3, stage (s)       -       -       -         5 (s)       2.2       3.6       3.4         0 queue free %       100       96       98         M capacity (veh/h)       1361       486       813         virrection, Lane #       EB 1       WB 1       NB 1         Olume Total       203       336       32         olume Left       0       1       18         Olume Capacity       0.12       0.00       0.5         ueue Length 95th (m)       0.0       0.0       1.5         oproach Delay (s)       0.0       0.0       1.5         oproach LOS       B       -         netresection Summary       0.7       1CU Level of Service         nalysis Period (min)       15       -	Upstream signal (m)							
C, conflicting volume         211         546         206           C1, stage 1 conf vol         2         2         3           C2, stage 2 conf vol         211         546         206           C2, stage 2 conf vol         211         546         206           C, unblocked vol         211         546         206           C, stage (s)         2         3.6         3.4           C queue free %         100         96         98           M capacity (veh/h)         1361         486         813           itrection Lane #         EB1         WB1         NB1           folume Total         203         336         32           olume Total         0.3         336         32           olume Left         0         14         546           SH         1700         1361         590           olume Legt         0.0         0.0         1.3           control Delay (s)         0.0         0.0         1.3           prorach Delay (s)         0.0         0.0         1.5           pproach Delay (s)         0.0         0.0         1.5           pproach LOS         B         1.5         1.5	pX, platoon unblocked							
C1, stage 1 conf vol         C2, stage 2 conf vol         C2, stage 2 conf vol         C2, unblocked vol       211       546       206         C, single (s)       4.1       6.5       6.3         Z, 2 stage (s)       2.2       3.6       3.4         O queue free %       100       96       98         M capacity (veh/h)       1361       486       813         Irrection, Lane #       EB 1       WB 1       NB 1         folume Left       0       1       18         folume Right       10       0       14         SH       1700       1361       590         folume Left       0.1       1.3       1.3         folume Legt by 5th (m)       0.0       0.0       1.3         iontrol Delay (s)       0.0       0.0       1.15         pproach Delay (s)       0.0       0.0       11.5         pproach LOS       B       10       11         ttersection Summary       0.7       10U Level of Service         ralysis Period (min)       15       15	vC, conflicting volume			211		546	206	
C2, stage 2 conf vol         Cu, unblocked vol       211       546       206         C, single (s)       4.1       6.5       6.3         2, stage (s)       546       206       200         F (s)       2.2       3.6       3.4         0 queue free %       100       96       98         M capacity (veh/h)       1361       486       813         Irrection, Lane #       EB 1       WB 1       NB 1         Olume Total       203       336       32         folume Left       0       1       18         Olume Loft       0.1       18       100       0.0         SH       1700       1361       590       100       10.5         Jueue Length 95th (m)       0.0       0.0       1.3       100       11.5         oproach LoS       A       B       500       11.5       15       11.5         pproach LOS       B       11.5       11.5       11.5       11.5       11.5         pproach LOS       B       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5       11.5 <td>vC1, stage 1 conf vol</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	vC1, stage 1 conf vol							
Cu, unbiocked vol         211         546         206           c, single (s)         4.1         6.5         6.3           2, 2 stage (s)         .         .         .           r(s)         2.2         3.6         3.4           0 queue free %         100         96         98           M capacity (veh/h)         1361         486         813           virrection, Lane #         EB 1         WB 1         NB 1           Volume Total         203         336         32           olume Left         0         1         18           olume Right         10         0         14           SH         1700         1361         590           olume Capacity         0.12         0.00         0.05           ueue Length 95th (m)         0.0         0.0         1.3           optroach Delay (s)         0.0         0.0         11.5           pproach LOS         B	vC2, stage 2 conf vol							
C, single (s)       4.1       6.5       6.3         C, 2 stage (s)       -       -       -         F(s)       2.2       3.6       3.4         0 queue free %       100       96       98         M capacity (veh/h)       1361       486       813         vircetion, Lane #       EB 1       WB 1       NB 1         olume Total       203       336       32         olume Right       0       1       18         olume Right       10       0       14         SH       1700       1361       590         volume to Capacity       0.12       0.00       0.05         volume to Capacity       0.12       0.00       0.05         volume to Capacity       0.12       0.00       0.05         volume Length 95th (m)       0.0       0.0       1.3         optroch Delay (s)       0.0       0.0       11.5         pproach Delay (s)       0.0       0.0       11.5         pproach LOS       B       10       10         tersection Capacity Utilization       27.0%       ICU Level of Service         nalysis Period (min)       15       15	vCu, unblocked vol			211		546	206	
C, 2 stage (s)       2.2       3.6       3.4         0 queue free %       100       96       98         M capacity (veh/h)       1361       486       813         irrection, Lane #       EB 1       WB 1       NB 1         folume Total       203       336       32         olume Left       0       1       18         folume Right       10       0       14         SH       1700       1361       590         folume to Capacity       0.12       0.00       0.05         four to Capacity       0.12       0.00       0.05         four to Capacity       0.10       11.5       ane LOS         ane LOS       A       B       pproach LOS       B         itersection Summary       0.7       tersection Capacity Utilization       27.0%         itersection Capacity Utilization       27.0%       ICU Level of Service	tC, single (s)			4.1		6.5	6.3	
E (s)         2.2         3.6         3.4           0 queue free %         100         96         98           M capacity (veh/h)         1361         486         813           irrection, Lane #         EB 1         WB 1         NB 1           Olume Total         203         336         32           folume Left         0         1         18           Olume Left         0         14         590           SH         1700         1361         590           Olume Legt (s)         0.12         0.00         0.05           ueue Length 95th (m)         0.0         0.0         1.3           ontrol Delay (s)         0.0         0.0         11.5           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B         11         11           tersection Summary         0.7         12         12           verage Delay         0.7         12         12         12           alysis Period (min)         15         15         12	tC, 2 stage (s)							
0 queue free % 100 96 98 M capacity (veh/h) 1361 486 813 irrection, Lane # EB 1 WB 1 NB 1 folume Total 203 336 32 folume Loft 0 1 18 folume Right 10 0 14 SH 1700 1361 590 folume to Capacity 0.12 0.00 0.05 tueue Length 95th (m) 0.0 0.0 11.5 ane LOS A B pproach Delay (s) 0.0 0.0 11.5 pproach Delay (s) 0.0 10.0 11.5 pproach Delay (s) 0.0 10.0 11.5 pproach Delay (s) 0.0 0.0 11.5 pproach Delay (s) 0.0 10.0 11.5 pproach Delay (s) 15	tF (s)			2.2		3.6	3.4	
M capacity (veh/h)         1361         486         813           irrection, Lane #         EB 1         WB 1         NB 1           olume Total         203         336         32           olume Total         203         336         32           olume Left         0         1         18           olume Right         10         0         14           SH         1700         1361         590           rolume to Capacity         0.12         0.00         0.05           ueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         11.5           approach Delay (s)         0.0         0.0         11.5           pproach Delay (s)         0.0         0.0         11.5           uersection Summary         B         1000000000000000000000000000000000000	p0 queue free %			100		96	98	
Interction, Lane #         EB 1         WB 1         NB 1           Volume Total         203         336         32           Volume Left         0         1         18           Volume Right         10         0         14           SH         1700         1361         590           Volume to Capacity         0.12         0.00         0.05           Jueue Length 95th (m)         0.0         0.0         1.3           icontrol Delay (s)         0.0         0.0         11.5           ane LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B         115         115           tersection Summary         0.7         120         120           verage Delay         0.7         120         120           analysis Period (min)         15         15         120	cM capacity (veh/h)			1361		486	813	
Value         Total         203         336         32           olume Left         0         1         18           olume Right         10         0         14           SH         1700         1361         590           olume to Capacity         0.12         0.00         0.05           jueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         11.5           ape LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B         B           tersection Summary         0.7         tersection Capacity Utilization           aplysis Period (min)         15         15	Direction, Lane #	EB 1	WB 1	NB 1				
folume Left         0         1         18           olume Right         10         0         14           SH         1700         1361         590           olume to Capacity         0.12         0.00         0.05           tueue Length 95th (m)         0.0         0.0         1.3           ontrol Delay (s)         0.0         0.0         1.5           pproach Delay (s)         0.0         0.0         1.5           pproach LOS         B         B           tersection Summary         0.7         ICU Level of Service           alysis Period (min)         15	Volume Total	203	336	32				
Ioume Right         10         0         14           SH         1700         1361         590           Iolume to Capacity         0.12         0.00         0.05           Ioueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         11.5           approach Delay (s)         0.0         0.0         11.5           pproach LOS         B         B           tersection Summary         0.7         1           verage Delay         0.7         1           analysis Period (min)         15         15	Volume Left	0	1	18				
SH         1700         1361         590           folume to Capacity         0.12         0.00         0.05           bueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         11.5           ane LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B         B           tersection Summary         0.7         tersection Capacity Utilization           analysis Period (min)         15         5	Volume Right	10	0	14				
olume to Capacity         0.12         0.00         0.05           lueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         1.5           ane LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B         B           tersection Summary         0.7         ICU Level of Service           alwsis Period (min)         15         D	cSH	1700	1361	590				
bueue Length 95th (m)         0.0         0.0         1.3           control Delay (s)         0.0         0.0         11.5           ane LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B           tersection Summary         0.7           tersection Capacity Utilization         27.0%         ICU Level of Service           alsysis Period (min)         15	Volume to Capacity	0.12	0.00	0.05				
control Delay (s)         0.0         0.0         11.5           ane LOS         A         B           pproach Delay (s)         0.0         0.0         11.5           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B	Queue Length 95th (m)	0.0	0.0	1.3				
A         B           pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B	Control Delay (s)	0.0	0.0	11.5				
pproach Delay (s)         0.0         0.0         11.5           pproach LOS         B           tersection Summary         0.7           verage Delay         0.7           rtersection Capacity Utilization         27.0%           ICU Level of Service           nalysis Period (min)         15	Lane LOS		А	В				
pproach LOS B tersection Summary verage Delay 0.7 itersection Capacity Utilization 27.0% ICU Level of Service nalysis Period (min) 15	Approach Delay (s)	0.0	0.0	11.5				
tersection Summary verage Delay 0.7 tersection Capacity Utilization 27.0% ICU Level of Service nalvsis Period (min) 15	Approach LOS			В				
verage Delay 0.7 tersection Capacity Utilization 27.0% ICU Level of Service // nalysis Period (min) 15	Intersection Summarv							
tersection Capacity Utilization 27.0% ICU Level of Service A nalysis Period (min) 15	verage Delav			0.7				-
nalysis Period (min) 15	ntersection Capacity Utilization	ation		27.0%	IC	CU Level o	of Service	1
	Analysis Period (min)			15				

Baseline

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Baseline

2: Strathearne Place	e & Ma	rion St	treet				12/07/20
	≯	-	+	•	1	-	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ર્સ	ĥ		Y		
Traffic Volume (vph)	0	12	5	4	21	0	
Future Volume (vph)	0	12	5	4	21	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt			0.940				
Flt Protected					0.950		
Satd. Flow (prot)	0	1921	1625	0	1825	0	
Flt Permitted					0.950		
Satd. Flow (perm)	0	1921	1625	0	1825	0	
Link Speed (k/h)		50	50		50		
Link Distance (m)		247.0	147.1		197.6		
Travel Time (s)		17.8	10.6		14.2		
Confl. Peds. (#/hr)	5			5		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	
Adj. Flow (vph)	0	13	5	4	23	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	13	9	0	23	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0	, in the second s	3.7	, in the second se	
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.9	4.9		4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24			14	24	14	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type: C	Other						
Control Type: Unsignalized							
Intersection Capacity Utilizati	on 15.2%			IC	CU Level	of Service A	
Analysis Period (min) 15							

2: Strathearne Place	ce & Ma	ction C irion S	Japacit treet	y Anal	Dase real Aivi Peak Hour.sy 12/07/20			
	۶	-	+	*	1	1		
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		થ	î.		¥.			
Traffic Volume (veh/h)	0	12	5	4	21	0		
Future Volume (Veh/h)	0	12	5	4	21	0		
Sign Control		Free	Free		Stop			
Grade		0%	0%		0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	0	13	5	4	23	0		
Pedestrians		1			5			
Lane Width (m)		3.7			3.7			
Walking Speed (m/s)		1.1			1.1			
Percent Blockage		0			0			
Right turn flare (veh)								
Median type		None	None					
Median storage veh)								
Upstream signal (m)								
pX, platoon unblocked								
vC, conflicting volume	14				25	13		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	14				25	13		
tC, single (s)	4.1				6.4	6.2		
tC, 2 stage (s)								
tF (s)	2.2				3.5	3.3		
p0 queue free %	100				98	100		
cM capacity (veh/h)	1609				991	1067		
Direction, Lane #	EB 1	WB 1	SB 1					
Volume Total	13	9	23					
Volume Left	0	0	23					
Volume Right	0	4	0					
cSH	1609	1700	991					
Volume to Capacity	0.00	0.01	0.02					
Queue Length 95th (m)	0.0	0.0	0.5					
Control Delay (s)	0.0	0.0	8.7					
Lane LOS			А					
Approach Delay (s)	0.0	0.0	8.7					
Approach LOS			А					
Intersection Summary								
Average Delay			4.5					
Intersection Capacity Utiliza	ation		15.2%	IC	U Level	of Service	A	
Analysis Period (min)			15					

Baseline

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Baseline

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		\$			\$			\$			\$	
Traffic Volume (vph)	27	0	5	0	0	0	5	150	0	0	53	6
Future Volume (vph)	27	0	5	0	0	0	5	150	0	0	53	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980									0.985	
Flt Protected		0.959						0.999				
Satd. Flow (prot)	0	1805	0	0	1921	0	0	1803	0	0	1669	C
Flt Permitted		0.959						0.999				
Satd. Flow (perm)	0	1805	0	0	1921	0	0	1803	0	0	1669	C
_ink Speed (k/h)		50			50			50			50	
_ink Distance (m)		147.1			34.4			95.3			383.1	
Travel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	20%	6%	0%	0%	15%	0%
Adj. Flow (vph)	29	0	5	0	0	0	5	163	0	0	58	7
Shared Lane Traffic (%)												
ane Group Flow (vph)	0	34	0	0	0	0	0	168	0	0	65	C
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
ane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
/ledian Width(m)		0.0			0.0			0.0			0.0	
_ink Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Furning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Analysis Period (min) 15

3: Homestead Drive & Strathearne Place 12/07/2017 ≯ 1 ~ 1 -۰ ŧ 1 → `¥ Movement EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Lane Configurations \$ \$ 4 \$ Sign Control Stop Stop Stop Stop Traffic Volume (vph) 27 0 5 0 0 0 5 150 0 0 53 6 Future Volume (vph) 150 53 27 0 0 0 0 5 0 0 6 5 Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Hourly flow rate (vph) 29 0 5 0 0 0 5 163 0 0 58 7 EB 1 Direction, Lane # WB1 NB1 SB 1 Volume Total (vph) 34 0 168 65 Volume Left (vph) 29 0 5 0 Volume Right (vph) 5 0 7 0 Hadj (s) 0.08 0.00 0.12 0.16 Departure Headway (s) 4.5 4.5 4.2 4.3 Degree Utilization, x 0.19 0.08 0.04 0.00 Capacity (veh/h) 758 774 847 820 Control Delay (s) 7.7 7.5 8.2 7.7 Approach Delay (s) 7.7 0.0 8.2 7.7 Approach LOS А А А А Intersection Summary Delay 8.0 Level of Service Α Intersection Capacity Utilization Analysis Period (min) 21.9% ICU Level of Service А 15

HCM Unsignalized Intersection Capacity Analysis

Baseline

Synchro 9 Report

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Base Year AM Peak Hour.syn

Baseline

	-	~		-	•	-	
Lane Group	FRT	FRP	WRI	WRT	NRI	NRP	
Lano Configurations	1.	LDIX	WDL	1	MDL	NDI	
Traffic Volume (whh)	268	16	25	1/10	15	6	
Futuro Volumo (vph)	200	16	25	1/0	15	6	
Ideal Elew (unbol)	1000	1000	1000	1000	1000	1000	
ano I Itil Eactor	1,00	1,00	1,00	1,00	1,00	1,00	
Part Bika Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Cu Dike Factor	0.002				0.050		
It Protected	0.993			0.003	0.939		
Satd Flow (prot)	1072	0	0	1900	1790	0	
Elt Dormittod	1072	U	U	0.002	0.066	U	
Satd Flow (norm)	1070	0	0	1900	1790	0	
Jalu. Flow (perifi)	10/2	0	0	1009	1760 E0	0	
Link Speeu (k/ii)	242.7			264.6	00.7		
LINK DISIGNCE (III)	242.7			204.0	90.7		
Confl Dode (#/br)	17.5	11	11	19.1	7.1		
Conn. Peus. (#/nr) Dook Llour Footor	0.02	0.00	0.02	0.00	0.00	0.00	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy venicles (%)	270	0%	870	070 140	0%	0%	
Auj. Flow (vpH) Charad Lana Traffia (0/)	291	17	21	102	10	1	
Shared Lane Hallic (%)	200	0	0	100	22	0	
Larie Group Flow (vpri)	308	No	U No	189	23 No	U	
Enter DIOCKEU InterSection	INO Loft	NU Diaht	UVI Loft	INO	UVI Loft	NU	
Lane Allynment Modion Width(m)	Leit	Right	Leit	Leit	Leit	Right	
ink Offect(m)	0.0			0.0	3.7		
Crosswalk Width(m)	0.0			0.0	0.0		
	4.9			4.9	4.9		
Hoodway Easter	0.00	0.00	0.00	0.00	0.00	0.00	
Turping Speed (k/h)	0.99	0.99	0.99	0.99	0.99	0.99	
Furning Speed (K/N)	Eroc	14	24	Eroc	24 Stor	14	
	Fiee			Fiee	Stop		
Intersection Summary							
Area Type: 0	Other						
Control Type: Unsignalized							
Intersection Capacity Utilizat	ion 37.7%			IC	CU Level of	of Service A	
Analysis Period (min) 15							

HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road Base Year PM Peak Hour.syn 12/07/2017

	-	$\mathbf{\hat{z}}$	4	+	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	eî Î			ę	Y		
Traffic Volume (veh/h)	268	16	25	149	15	6	
Future Volume (Veh/h)	268	16	25	149	15	6	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	291	17	27	162	16	7	
Pedestrians					11		
Lane Width (m)					3.7		
Walking Speed (m/s)					1.1		
Percent Blockage					1		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume			319		526	310	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			319		526	310	
tC, single (s)			4.2		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.3		3.5	3.3	
p0 queue free %			98		97	99	
cM capacity (veh/h)			1195		498	726	
Direction Long #	ED 1	WD 1	ND 1				
Volumo Total	200	100	1101				
Volume Loft	308	189	23				
Volume Leit	17	21	10				
volume Right	1700	1105	/				
CSH Values to Canadity	1/00	1195	551				
	0.18	0.02	0.04				
Queue Length 95th (m)	0.0	0.5	1.0				
Control Delay (s)	0.0	1.3	11.8				
Lane LUS	0.0	A	B				
Approach Delay (s)	0.0	1.3	11.8				
Approach LUS			В				
Intersection Summary							
Average Delay			1.0				
Intersection Capacity Utiliza	ation		37.7%	IC	U Level o	of Service	
Analysis Period (min)			15				

5:00 pm Baseline

Synchro 9 Report Page 1

5:00 pm Baseline

Lanes, Volumes, Tir 2: Strathearne Place	mings e & Ma	rion St	treet				Base Year PM Peak Hour.syr 12/07/2013
	≯	-	+	•	1	1	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		۴.	eî 🕺		Y		
Traffic Volume (vph)	0	10	12	14	8	0	
Future Volume (vph)	0	10	12	14	8	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt			0.928				
Flt Protected					0.950		
Satd. Flow (prot)	0	1921	1631	0	1825	0	
Flt Permitted					0.950		
Satd. Flow (perm)	0	1921	1631	0	1825	0	
Link Speed (k/h)		50	50		50		
Link Distance (m)		247.0	147.1		197.6		
Travel Time (s)		17.8	10.6		14.2		
Confl. Peds. (#/hr)	5			5		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	
Adj. Flow (vph)	0	11	13	15	9	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	11	28	0	9	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		3.7		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.9	4.9		4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24			14	24	14	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type: C	Other						
Control Tuno, Unoignalized							

Control Type: Unsignalized Intersection Capacity Utilization 15.2% ICU Level of Service A Analysis Period (min) 15

2: Strathearne Place & Marion Street 12/07/2017 ⊁ × . ✓ ← ۰. -Movement EBL EBT WBT WBR SBL SBR Lane Configurations ¥ **র্ন** 10 1 Traffic Volume (veh/h) 0 12 14 0 8 Future Volume (Veh/h) 0 10 12 14 8 0 Sign Control Stop Free Free Grade 0% 0% 0% Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 Hourly flow rate (vph) 0 11 13 15 9 0 Pedestrians 5 1 Lane Width (m) 3.7 3.7 Walking Speed (m/s) 1.1 1.1 Percent Blockage 0 0 Right turn flare (veh) Median type None None Median storage veh) Upstream signal (m) pX, platoon unblocked vC, conflicting volume 33 36 26 vC1, stage 1 conf vol vC2, stage 2 conf vol vCu, unblocked vol 33 36 26 tC, single (s) 4.1 6.4 6.2 tC, 2 stage (s) tF (s) 2.2 3.5 3.3 p0 queue free % 100 100 99 cM capacity (veh/h) 1584 976 1049 Direction, Lane # EB 1 WB 1 SB 1 Volume Total 11 28 9 Volume Left 0 0 9 Volume Right 0 15 0 cSH 1584 1700 976 Volume to Capacity 0.00 0.02 0.01 Queue Length 95th (m) 0.0 0.0 0.2 Control Delay (s) 0.0 0.0 8.7 Lane LOS A Approach Delay (s) 0.0 0.0 8.7 Approach LOS Α Intersection Summary Average Delay 1.6 Intersection Capacity Utilization 15.2% ICU Level of Service А Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

5:00 pm Baseline

Synchro 9 Report Page 4

Base Year PM Peak Hour.syn

5:00 pm Baseline

Synchro 9 Report

Page 3

ane Group ane Configurations raffic Volume (vph) uture Volume (vph) deal Flow (vphp) ane Util. Factor red Bike Factor rit Protected stad. Flow (prot) (It Permitted stad. Flow (perm) isk Speed (kth)	EBL 15 15 1900 1.00	EBT 0 0 1900 1.00 0.968 0.963	EBR 5 5 1900 1.00	WBL 0 0 1900 1.00	WBT 0 0 1900	WBR 0 0	NBL 5	NBT	NBR 0	SBL 0	SBT 4 213	SBR 23
ane Configurations raffic Volume (vph) iuture Volume (vph) deal Flow (vphpl) ane Util. Factor red Bike Factor rf it Protected latd. Flow (prot) it Permitted statd. Flow (pem) is K Speed (kth)	15 15 1900 1.00	0 0 1900 1.00 0.968 0.963	5 5 1900 1.00	0 0 1900 1.00	0 0 1900	0 0	5	<b>↔</b> 99	0	0	<b>4</b> 213	23
raffic Volume (vph) iuture Volume (vph) deal Flow (vphpl) ane Util. Factor Ped Bike Factor it Protected stad. Flow (prot) it Permitted stad. Flow (pem) isk Speed (ktb)	15 15 1900 1.00	0 0 1900 1.00 0.968 0.963	5 5 1900 1.00	0 0 1900 1.00	0 0 1900	0 0	5 5	99	0	0	213	23
uture Volume (vph) Jeal Flow (vphpl) ane Util. Factor red Bike Factor rit It Protected Stad. Flow (prot) it Permitted Stad. Flow (pem) it Speed (//b)	15 1900 1.00	0 1900 1.00 0.968 0.963	5 1900 1.00	0 1900 1.00	0 1900	0	5	00				
deal Flow (vphpt) ane Util. Factor Ped Bike Factor it It Protected Satd. Flow (prot) It Permitted Jatd. Flow (perm) Jatd. Flow (perm)	1900 1.00 0	1900 1.00 0.968 0.963	1900 1.00	1900 1.00	1900	4000		99	0	0	213	23
ane Util. Factor ed Bike Factor it It Protected Sadd. Flow (prot) It Permitted Sadd. Flow (perm) isk Speed (//b)	1.00	1.00 0.968 0.963	1.00	1.00	1.00	1900	1900	1900	1900	1900	1900	1900
Ped Bike Factor int It Protected iatd. Flow (prot) It Permitted Sadd. Flow (perm) isk Spaced (ktb)	0	0.968			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
irt It Protected satd. Flow (prot) It Permitted Satd. Flow (perm) isk Spage ( /kb)	0	0.968 0.963										
It Protected Satd. Flow (prot) It Permitted Satd. Flow (perm) Ink Spood (//b)	0	0.963									0.987	
Satd. Flow (prot) It Permitted Satd. Flow (perm) Satd. Spood (k/b)	0							0.998				
It Permitted Satd. Flow (perm)		1791	0	0	1921	0	0	1881	0	0	1846	C
Satd. Flow (perm)		0.963						0.998				
ink Spood (k/b)	0	1791	0	0	1921	0	0	1881	0	0	1846	C
		50			50			50			50	
ink Distance (m)		147.1			34.4			95.3			383.1	
ravel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
leavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
dj. Flow (vph)	16	0	5	0	0	0	5	108	0	0	232	25
Shared Lane Traffic (%)												
ane Group Flow (vph)	0	21	0	0	0	0	0	113	0	0	257	C
Inter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
ane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
/ledian Width(m)		0.0			0.0			0.0			0.0	
ink Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
wo way Left Turn Lane												
leadway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
urning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
ntersection Summary												

Synchro 9 Report Page 5

HCM Unsignalized 3: Homestead Driv	Interse e & Stra	ction C athearn	apacit e Plac	y Anal æ	ysis			Base '	Year P	M Pea	ak Hou 12/0	r.syr )7/201
	≯	+	$\mathbf{F}$	4	+	*	•	1	1	1	ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			÷			÷			÷	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	0	5	0	0	0	5	99	0	0	213	23
Future Volume (vph)	15	0	5	0	0	0	5	99	0	0	213	23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	0	5	0	0	0	5	108	0	0	232	25
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	21	0	113	257								
Volume Left (vph)	16	0	5	0								
Volume Right (vph)	5	0	0	25								
Hadj (s)	0.01	0.00	0.04	-0.01								
Departure Headway (s)	4.7	4.7	4.2	4.1								
Degree Utilization, x	0.03	0.00	0.13	0.29								
Capacity (veh/h)	701	706	828	878								
Control Delay (s)	7.8	7.7	7.9	8.7								
Approach Delay (s)	7.8	0.0	7.9	8.7								
Approach LOS	А	A	А	А								
Intersection Summary												
Delay			8.4									
Level of Service			А									
Intersection Capacity Utiliza	ition		22.8%	IC	U Level o	of Service			A			
Analysis Period (min)			15									

5:00 pm Baseline

Synchro 9 Report Page 6

5:00 pm Baseline

	-	$\mathbf{r}$	1	+	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4Î			ę	Y	
Traffic Volume (vph)	352	9	18	434	18	31
Future Volume (vph)	352	9	18	434	18	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.997				0.915	
Flt Protected				0.998	0.982	
Satd, Flow (prot)	1839	0	0	1830	1609	0
Flt Permitted				0.998	0.982	
Satd. Flow (perm)	1839	0	0	1830	1609	0
Link Speed (k/h)	50		,	50	50	
Link Distance (m)	242.7			264.6	98.7	
Travel Time (s)	17.5			19.1	7.1	
Confl. Peds. (#/hr)		8	8		3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	11%	0%	5%	6%	8%
Adi, Flow (vph)	383	10	20	472	20	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	393	0	0	492	54	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	5.
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	
-						
Intersection Summary	0.1					
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utiliza	tion 47.4%			10	CU Level of	of Service
Analysis Dariad (min) 1E						

HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road 2022 Background AM Peak Hour.syn 12/07/2017

	-	$\mathbf{\hat{z}}$	4	+	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	ĥ			ę	Y		
Traffic Volume (veh/h)	352	9	18	434	18	31	
Future Volume (Veh/h)	352	9	18	434	18	31	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	383	10	20	472	20	34	
Pedestrians	3				8		
Lane Width (m)	3.7				3.7		
Walking Speed (m/s)	1.1				1.1		
Percent Blockage	0				1		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume			401		911	396	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			401		911	396	
tC, single (s)			4.1		6.5	6.3	
tC, 2 stage (s)							
tF (s)			2.2		3.6	3.4	
p0 queue free %			98		93	95	
cM capacity (veh/h)			1159		291	635	
Direction Long #	ED 1	WD 1	ND 1				
Volumo Total	202	402					
Volume Loft	393	492	24				
Volume Dight	10	20	20				
volume Right	1700	1150	34				
CSH Volume to Consolity	1/00	0.02	442				
Volume to Capacity	0.23	0.02	0.12				
Queue Lengin 95in (m)	0.0	0.4	3.1				
Control Delay (s)	0.0	0.5	14.3				
Lane LUS	0.0	A	B				
Approach Delay (s)	0.0	0.5	14.3				
Approach LUS			В				
Intersection Summary							
Average Delay			1.1				
Intersection Capacity Utiliza	ation		47.4%	IC	U Level o	of Service	
Analysis Period (min)			15				
,							

Baseline

Synchro 9 Report Page 2

Baseline

			-	•	1	1	
	-	-				•	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		র্শ	<b>f</b>		Y		
Traffic Volume (vph)	0	13	5	4	22	0	
Future Volume (vph)	0	13	5	4	22	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt			0.940				
Flt Protected					0.950		
Satd. Flow (prot)	0	1921	1625	0	1825	0	
Flt Permitted					0.950		
Satd. Flow (perm)	0	1921	1625	0	1825	0	
Link Speed (k/h)		50	50		50		
Link Distance (m)		247.0	147.1		197.6		
Travel Time (s)		17.8	10.6		14.2		
Confl. Peds. (#/hr)	5			5		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	
Adj. Flow (vph)	0	14	5	4	24	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	14	9	0	24	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0		3.7		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.9	4.9		4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24			14	24	14	
Sign Control		Free	Free		Stop		
Intersection Summany	_						

ICU Level of Service A

2: Strathearne Place & Marion Street 12/07/2017 ⊁ X X 4 ← -Movement EBL EBT WBT WBR SBL SBR Lane Configurations Y **4** 13 Þ Traffic Volume (veh/h) 0 22 0 5 Future Volume (Veh/h) 0 13 5 4 22 0 Sign Control Free Free Stop Grade 0% 0% 0% Peak Hour Factor 0.92 0.92 0.92 0.92 0.92 0.92 Hourly flow rate (vph) 0 14 5 4 24 0 Pedestrians 5 1 Lane Width (m) 3.7 3.7 Walking Speed (m/s) 1.1 1.1 Percent Blockage 0 0 Right turn flare (veh) Median type None None Median storage veh) Upstream signal (m) pX, platoon unblocked vC, conflicting volume 14 26 13 vC1, stage 1 conf vol vC2, stage 2 conf vol vCu, unblocked vol 14 26 13 tC, single (s) 4.1 6.4 6.2 tC, 2 stage (s) 2.2 3.5 3.3 tF (s) p0 queue free % 100 100 98 cM capacity (veh/h) 1609 990 1067 Direction, Lane # EB 1 WB 1 SB 1 Volume Total 14 9 24 Volume Left 0 0 24 Volume Right 0 4 0 cSH 1609 1700 990 Volume to Capacity 0.00 0.01 0.02 Queue Length 95th (m) 0.0 0.0 0.6 Control Delay (s) 0.0 0.0 8.7 Lane LOS A Approach Delay (s) 0.0 0.0 8.7 Approach LOS Α Intersection Summary 4.5 Average Delay Intersection Capacity Utilization 15.2% ICU Level of Service А Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis

Baseline

Synchro 9 Report Page 4

2022 Background AM Peak Hour.syn

Baseline

Intersection Capacity Utilization 15.2%

Analysis Period (min) 15

Synchro 9 Report

Page 3

	≯	-	$\mathbf{i}$	1	-		1	1	1	1	÷.	-
ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
ane Configurations		\$			\$			4			4	
raffic Volume (vph)	28	0	5	0	0	0	5	164	0	0	63	6
uture Volume (vph)	28	0	5	0	0	0	5	164	0	0	63	6
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ed Bike Factor												
rt		0.981									0.987	
It Protected		0.959						0.999				
atd. Flow (prot)	0	1807	0	0	1921	0	0	1804	0	0	1669	0
It Permitted		0.959						0.999				
atd. Flow (perm)	0	1807	0	0	1921	0	0	1804	0	0	1669	0
ink Speed (k/h)		50			50			50			50	
ink Distance (m)		147.1			34.4			95.3			383.1	
ravel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							3					3
eak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
leavy Vehicles (%)	0%	0%	0%	0%	0%	0%	20%	6%	0%	0%	15%	0%
ıdj. Flow (vph)	30	0	5	0	0	0	5	178	0	0	68	7
hared Lane Traffic (%)												
ane Group Flow (vph)	0	35	0	0	0	0	0	183	0	0	75	0
nter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
ane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
ledian Width(m)		0.0			0.0			0.0			0.0	
ink Offset(m)		0.0			0.0			0.0			0.0	
crosswalk Width(m)		4.9			4.9			4.9			4.9	
wo way Left Turn Lane												
leadway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
urning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Capacity Utilization 22.7% Analysis Period (min) 15

Synchro 9 Report Page 5

HCM Unsignalized 3: Homestead Driv	Interse e & Stra	ction C athearn	apacit e Plac	y Anal æ	ysis	2	2022 E	ackgro	ound A	M Pea	ak Hou 12/0	r <b>.syn</b> )7/2017
	۶	-	$\mathbf{F}$	1	+	*	1	1	1	1	Ŧ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			÷			÷			÷	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	0	5	0	0	0	5	164	0	0	63	6
Future Volume (vph)	28	0	5	0	0	0	5	164	0	0	63	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	5	0	0	0	5	178	0	0	68	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	35	0	183	75								
Volume Left (vph)	30	0	5	0								
Volume Right (vph)	5	0	0	7								
Hadj (s)	0.09	0.00	0.11	0.18								
Departure Headway (s)	4.6	4.5	4.2	4.3								
Degree Utilization, x	0.04	0.00	0.21	0.09								
Capacity (veh/h)	745	761	844	813								
Control Delay (s)	7.8	7.5	8.3	7.8								
Approach Delay (s)	7.8	0.0	8.3	7.8								
Approach LOS	А	A	А	А								
Intersection Summary												
Delay			8.1									
Level of Service			А									
Intersection Capacity Utiliza	ition		22.7%	IC	U Level o	of Service			А			
Analysis Period (min)			15									

Baseline

Synchro 9 Report Page 6

Baseline

				-				
	-	¥.	-	-		1		
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	Þ			4	Y			
Traffic Volume (vph)	416	17	38	305	16	17		
Future Volume (vph)	416	17	38	305	16	17		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor								
Frt	0.995				0.931			
Flt Protected				0.995	0.976			
Satd. Flow (prot)	1875	0	0	1815	1746	0		
Flt Permitted				0.995	0.976			
Satd. Flow (perm)	1875	0	0	1815	1746	0		
Link Speed (k/h)	50			50	50			
Link Distance (m)	242.7			264.6	98.7			
Travel Time (s)	17.5			19.1	7.1			
Confl. Peds. (#/hr)		11	11					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	0%	8%	5%	0%	0%		
Adj. Flow (vph)	452	18	41	332	17	18		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	470	0	0	373	35	0		
Enter Blocked Intersection	No	No	No	No	No	No		
Lane Alignment	Left	Right	Left	Left	Left	Right		
Median Width(m)	0.0			0.0	3.7			
Link Offset(m)	0.0			0.0	0.0			
Crosswalk Width(m)	4.9			4.9	4.9			
Two way Left Turn Lane								
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99		
Turning Speed (k/h)		14	24		24	14		
Sign Control	Free			Free	Stop			
Intersection Summary								
Area Type: C	Other							
Control Type: Unsignalized								
Control Type: Unsignalized Intersection Capacity Utilizati	ion 54.5%			10	CU Level (	of Servic	e A	

HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road 2022 Background PM Peak Hour.syn 12/07/2017

	-	$\mathbf{\hat{z}}$	4	+	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	1,			ર્સ	Y		
Traffic Volume (veh/h)	416	17	38	305	16	17	
Future Volume (Veh/h)	416	17	38	305	16	17	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	452	18	41	332	17	18	
Pedestrians					11		
Lane Width (m)					3.7		
Walking Speed (m/s)					1.1		
Percent Blockage					1		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume			481		886	472	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			481		886	472	
tC, single (s)			4.2		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.3		3.5	3.3	
p0 queue free %			96		94	97	
cM capacity (veh/h)			1040		302	590	
Direction Long #	ED 1	WD 1	ND 1				
Vielumo Total	ED I	272	1100 1				
Volume Loft	4/0	3/3	35				
Volume Lett	0	41	1/				
volume Right	18	0	18				
CSH	1/00	1040	403				
Volume to Capacity	0.28	0.04	0.09				
Queue Length 95th (m)	0.0	0.9	2.2				
Control Delay (s)	0.0	1.3	14.8				
Lane LOS		A	В				
Approach Delay (s)	0.0	1.3	14.8				
Approach LOS			В				
Intersection Summary							
Average Delay			1.2				
Intersection Capacity Utiliza	ation		54.5%	IC	U Level o	of Service	
Analysis Period (min)			15				

5:00 pm Baseline

Synchro 9 Report Page 1

5:00 pm Baseline

Lanes, Volumes, Tir	nings						2022 Background PM Peak Hour.s
2: Strathearne Place	e & Ma	rion St	treet				12/07/2
	≯	-	+	*	1	~	
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	ef 🗧		Y		
Traffic Volume (vph)	0	11	13	15	8	0	
Future Volume (vph)	0	11	13	15	8	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt			0.928				
Flt Protected					0.950		
Satd. Flow (prot)	0	1921	1631	0	1825	0	
Flt Permitted					0.950		
Satd. Flow (perm)	0	1921	1631	0	1825	0	
Link Speed (k/h)		50	50		50		
Link Distance (m)		247.0	147.1		197.6		
Travel Time (s)		17.8	10.6		14.2		
Confl. Peds. (#/hr)	5			5		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	
Adj. Flow (vph)	0	12	14	16	9	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	12	30	0	9	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		0.0	0.0	5	3.7		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.9	4.9		4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24			14	24	14	
Sign Control		Free	Free		Stop		
Intersection Summary							
Area Type: O	)ther						
Control Type: Unsignalized							
Intersection Capacity Utilizati	on 15.2%			IC	CU Level o	of Servic	e A
A 1 1 D 1 1/ 1/ 45							

HCM Unsignalized Intersection Capacity Analysis 2: Strathearne Place & Marion Street  $\mathcal{F} \rightarrow \leftarrow \checkmark \checkmark \checkmark$ 

2022 Background PM Peak Hour.syn 12/07/2017

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		નુ	eî		¥		
Traffic Volume (veh/h)	0	11	13	15	8	0	
Future Volume (Veh/h)	0	11	13	15	8	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	12	14	16	9	0	
Pedestrians		1			5		
Lane Width (m)		3.7			3.7		
Walking Speed (m/s)		1.1			1.1		
Percent Blockage		0			0		
Right turn flare (veh)							
Median type		None	None				
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume	35				39	28	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	35				39	28	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				99	100	
cM capacity (veh/h)	1582				973	1047	
Direction Lane #	FB 1	WB 1	SB 1				
Volume Total	12	30	0				
Volume Left	12	0	9				
Volume Right	0	16	0				
rSH	1582	1700	973				
Volume to Canacity	0.00	0.02	0.01				
Oueue Length 95th (m)	0.00	0.02	0.01				
Control Delay (s)	0.0	0.0	8.7				
Lane LOS	0.0	0.0	Δ				
Approach Delay (s)	0.0	0.0	87				
Approach LOS	0.0	0.0	Α				
Intercection Summer					_	_	
Avorado Dolav			1 5				
Intersection Canacity Litilizy	ation		1.5	10		of Sonvico	٨
Analysis Doriod (min)	uuUII		13.270	IC		J JEI VICE	~
Analysis Penilla (IIIII)			10				

5:00 pm Baseline

Synchro 9 Report Page 3

5:00 pm Baseline

	≯	-	$\mathbf{r}$	1	+		•	<b>†</b>	1	1	÷.	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Volume (vph)	16	0	5	0	0	0	5	108	0	0	251	24
Future Volume (vph)	16	0	5	0	0	0	5	108	0	0	251	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.969									0.988	
Flt Protected		0.963						0.998				
Satd. Flow (prot)	0	1793	0	0	1921	0	0	1881	0	0	1847	C
Flt Permitted		0.963						0.998				
Satd. Flow (perm)	0	1793	0	0	1921	0	0	1881	0	0	1847	C
_ink Speed (k/h)		50			50			50			50	
Link Distance (m)		147.1			34.4			95.3			383.1	
Travel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	17	0	5	0	0	0	5	117	0	0	273	26
Shared Lane Traffic (%)												
ane Group Flow (vph)	0	22	0	0	0	0	0	122	0	0	299	C
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0	Ŭ		0.0	Ŭ		0.0	Ŭ		0.0	, in the second s
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												_
Area Type: O	ther											
Control Turner, United allocation												

5:00 pm Baseline

Synchro 9 Report Page 5

HCM Unsignalized 3: Homestead Driv	Interse e & Stra	ction C athearn	apacit ne Plac	y Anal æ	ysis	2	2022 E	ackgro	ound P	M Pea	12/0	r <b>.syn</b> )7/2017
	۶	+	*	4	Ŧ	*	•	1	1	1	Ļ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	16	0	5	0	0	0	5	108	0	0	251	24
Future Volume (vph)	16	0	5	0	0	0	5	108	0	0	251	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	0	5	0	0	0	5	117	0	0	273	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	22	0	122	299								
Volume Left (vph)	17	0	5	0								
Volume Right (vph)	5	0	0	26								
Hadj (s)	0.02	0.00	0.04	-0.01								
Departure Headway (s)	4.8	4.8	4.3	4.1								
Degree Utilization, x	0.03	0.00	0.15	0.34								
Capacity (veh/h)	680	684	818	874								
Control Delay (s)	8.0	7.8	8.0	9.1								
Approach Delay (s)	8.0	0.0	8.0	9.1								
Approach LOS	A	A	А	А								
Intersection Summary												
Delay			8.8									
Level of Service			А									
Intersection Capacity Utiliza	ition		24.7%	IC	U Level	of Service			А			
Analysis Period (min)			15									

5:00 pm Baseline

1: Marion Street & A	Airport	Road					12/11/201
	-	$\mathbf{\hat{z}}$	4	-	•	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	¢Î			<del>ا</del> ب	Y		
Traffic Volume (vph)	349	21	27	414	63	64	
Future Volume (vph)	349	21	27	414	63	64	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt	0.992				0.932		
Flt Protected				0.997	0.976		
Satd. Flow (prot)	1825	0	0	1829	1633	0	
Flt Permitted				0.997	0.976		
Satd. Flow (perm)	1825	0	0	1829	1633	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	242.7			264.6	98.7		
Travel Time (s)	17.5			19.1	7.1		
Confl. Peds. (#/hr)		8	8		3		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	4%	11%	0%	5%	6%	8%	
Adj. Flow (vph)	379	23	29	450	68	70	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	402	0	0	479	138	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0	-		0.0	3.7	_	
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	4.9			4.9	4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)		14	24		24	14	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type: (	Other						
Control Type: Unsignalized							

Intersection Capacity Utilization 58.0% ICU Level of Service B Analysis Period (min) 15 HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road 2022 Total AM Peak Hour.syn 12/11/2017

	-	$\rightarrow$	- 🗲	-	1	1
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ĥ			et.	¥.	
Traffic Volume (veh/h)	349	21	27	414	63	64
Future Volume (Veh/h)	349	21	27	414	63	64
Sian Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	379	23	29	450	68	70
Pedestrians	3				8	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	11				11	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)	None			NONC		
Unstream signal (m)						
nX nlatoon unblocked						
vC conflicting volume			410		910	398
vC1_stage 1 conf vol			410		710	370
vC1, stage 1 confivol						
vCu, unblocked vol			/10		010	208
tC cingle (c)			410		4 6	4.2
tC, Siriyie (S)			4.1		0.5	0.5
tC, Z Staye (S)			2.2		2.6	2.4
n (S)			2.2		3.0	00
pu queue nee 70			9/		200	69
civi capacity (veri/ri)			1151		209	033
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	402	479	138			
Volume Left	0	29	68			
Volume Right	23	0	70			
cSH	1700	1151	399			
Volume to Capacity	0.24	0.03	0.35			
Queue Length 95th (m)	0.0	0.6	11.5			
Control Delay (s)	0.0	0.8	18.7			
Lane LOS		А	С			
Approach Delay (s)	0.0	0.8	18.7			
Approach LOS			С			
Intersection Summary						
Average Delay			29			
Intersection Capacity Utiliza	ation		58.0%	IC	: U Level (	of Service
Analysis Period (min)			15	ic.	C LOFOI (	
Analysis Feriou (min)			10			

Baseline

Synchro 9 Report Page 1 Synchro 9 Report Page 2

Baseline

ane Group	≯		: Strathearne Place & Marion Street												
ane Group		-	+	*	1	1									
	EBL	EBT	WBT	WBR	SBL	SBR									
ane Configurations		र्भ	4Î		- Y										
Fraffic Volume (vph)	9	4	5	14	24	0									
Future Volume (vph)	9	4	5	14	24	0									
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900									
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00									
Ped Bike Factor															
Frt			0.899												
It Protected		0.966			0.950										
Satd. Flow (prot)	0	1856	1645	0	1825	0									
It Permitted		0.966			0.950										
Satd. Flow (perm)	0	1856	1645	0	1825	0									
ink Speed (k/h)		50	50		50										
ink Distance (m)		247.0	147.1		197.6										
Fravel Time (s)		17.8	10.6		14.2										
Confl. Peds. (#/hr)	5			5		1									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92									
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%									
Adj. Flow (vph)	10	4	5	15	26	0									
Shared Lane Traffic (%)															
ane Group Flow (vph)	0	14	20	0	26	0									
Enter Blocked Intersection	No	No	No	No	No	No									
ane Alignment	Left	Left	Left	Right	Left	Right									
Vedian Width(m)		0.0	0.0	<u> </u>	3.7										
Link Offset(m)		0.0	0.0		0.0										
Crosswalk Width(m)		4.9	4.9		4.9										
Two way Left Turn Lane															
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99									
Furning Speed (k/h)	24			14	24	14									
Sign Control		Free	Free		Stop										
ntersection Summary															
Area Type: O	ther														
Control Type: Unsignalized															
ntersection Capacity Utilization	on 17.7%			IC	CU Level of	of Service A									

2: Strathearne Place	i interse ce & Ma	rion C	Japacit treet	y Anal	ysis		2022 Total AM Peak Hour.syr 12/11/2013
	۶	-	-	×.	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ર્સ	1.		Y		
Traffic Volume (veh/h)	9	4	5	14	24	0	
Future Volume (Veh/h)	9	4	5	14	24	0	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	10	4	5	15	26	0	
Pedestrians		1			5		
Lane Width (m)		3.7			3.7		
Walking Speed (m/s)		1.1			1.1		
Percent Blockage		0			0		
Right turn flare (veh)							
Median type		None	None				
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume	25				42	18	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	25				42	18	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	99				97	100	
cM capacity (veh/h)	1595				964	1059	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	14	20	26				
Volume Left	10	0	26				
Volume Right	0	15	0				
cSH	1595	1700	964				
Volume to Capacity	0.01	0.01	0.03				
Queue Length 95th (m)	0.1	0.0	0.6				
Control Delay (s)	5.2	0.0	8.8				
Lane LOS	А		А				
Approach Delay (s)	5.2	0.0	8.8				
Approach LOS			А				
Intersection Summary							
Average Delay			5.0				
Intersection Capacity Utiliza	ation		17.7%	IC	U Level of	of Service	А
Analysis Period (min)			15				

Baseline

Synchro 9 Report Page 4

Baseline

	≯	-	$\mathbf{r}$	-	-		1	1	1	1	÷.	-
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		\$			\$			4			\$	
Traffic Volume (vph)	8	0	18	0	0	0	15	156	0	0	57	6
Future Volume (vph)	8	0	18	0	0	0	15	156	0	0	57	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.907									0.986	
Flt Protected		0.985						0.996				
Satd. Flow (prot)	0	1716	0	0	1921	0	0	1785	0	0	1669	0
Flt Permitted		0.985						0.996				
Satd. Flow (perm)	0	1716	0	0	1921	0	0	1785	0	0	1669	0
_ink Speed (k/h)		50			50			50			50	
Link Distance (m)		147.1			34.4			95.3			383.1	
Travel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	20%	6%	0%	0%	15%	0%
Adj. Flow (vph)	9	0	20	0	0	0	16	170	0	0	62	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	29	0	0	0	0	0	186	0	0	69	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0	Ŭ		0.0	Ŭ		0.0	, in the second s		0.0	Ŭ
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type: O	ther											
Control Typo: Unsignalized												

HCM Unsignalized Intersection Capacity Analysis 3: Homestead Drive & Strathearne Place . ~

2022 Total AM Peak Hour.syn 12/11/2017

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	≯	-	$\mathbf{F}$	1	+	*	•	1	1	1	÷.	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$			\$			\$	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	8	0	18	0	0	0	15	156	0	0	57	6
Future Volume (vph)	8	0	18	0	0	0	15	156	0	0	57	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	0	20	0	0	0	16	170	0	0	62	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	29	0	186	69								
Volume Left (vph)	9	0	16	0								
Volume Right (vph)	20	0	0	7								
Hadj (s)	-0.35	0.00	0.14	0.17								
Departure Headway (s)	4.1	4.5	4.2	4.3								
Degree Utilization, x	0.03	0.00	0.22	0.08								
Capacity (veh/h)	822	765	846	819								
Control Delay (s)	7.2	7.5	8.3	7.7								
Approach Delay (s)	7.2	0.0	8.3	7.7								
Approach LOS	А	А	А	А								
Intersection Summary												
Delay			8.1									
Level of Service			А									
Intersection Capacity Utilizati	ion		25.7%	IC	U Level o	of Service			А			
Analysis Period (min)			15									

Baseline

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Baseline

1: Marion Street & A	Airport	Road					12/11/201
	-	$\mathbf{\hat{z}}$	*	+	1	1	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	eî Î			<del>ا</del>	Y		
Traffic Volume (vph)	411	51	62	295	43	37	
Future Volume (vph)	411	51	62	295	43	37	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt	0.985				0.938		
Flt Protected				0.991	0.974		
Satd. Flow (prot)	1859	0	0	1804	1755	0	
Flt Permitted				0.991	0.974		
Satd. Flow (perm)	1859	0	0	1804	1755	0	
Link Speed (k/h)	50			50	50		
Link Distance (m)	242.7			264.6	98.7		
Travel Time (s)	17.5			19.1	7.1		
Confl. Peds. (#/hr)		11	11				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	0%	8%	5%	0%	0%	
Adj. Flow (vph)	447	55	67	321	47	40	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	502	0	0	388	87	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	0.0			0.0	3.7		
Link Offset(m)	0.0			0.0	0.0		
Crosswalk Width(m)	4.9			4.9	4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)		14	24		24	14	
Sign Control	Free			Free	Stop		
Intersection Summary							
Area Type: (	Other						
Control Type: Unsignalized							

Control Type: Unsignalized Intersection Capacity Utilization 58.5% ICU Level of Service B Analysis Period (min) 15 HCM Unsignalized Intersection Capacity Analysis 1: Marion Street & Airport Road 2022 Total PM Peak Hour.syn 12/11/2017

	-	$\rightarrow$	-	-	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	1
Lane Configurations	ĥ			ų	¥		
Traffic Volume (veh/h)	411	51	62	295	43	37	
Future Volume (Veh/h)	411	51	62	295	43	37	
Sian Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (yph)	447	55	67	321	47	40	
Pedestrians		00	07	021	11	10	
Lane Width (m)					3.7		
Walking Speed (m/s)					11		
Percent Blockage					1		
Right turn flare (veh)							
Modian type	None			None			
Median storage veh)	NOTIC			NUTC			
Linstroam signal (m)							
nX platoon unblockod							
vC conflicting volumo			512		040	196	
vC1_stage 1_conf.vol			515		740	400	
vC1, stage 1 confivol							
vCz, stage z coni voi			512		040	196	
tC cingle (c)			10		940	400	
tC, Single (S)			4.Z		0.4	0.2	
tC, Z Stage (S)			2.2		2 5	2.2	
IF (S)			2.3		3.0	3.3	
pu queue free %			93		83	93	
civi capacity (ven/n)			1011		212	5/9	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	502	388	87				
Volume Left	0	67	47				
Volume Right	55	0	40				
cSH	1700	1011	360				
Volume to Capacity	0.30	0.07	0.24				
Queue Length 95th (m)	0.0	1.6	7.1				
Control Delay (s)	0.0	2.1	18.2				
Lane LOS		А	С				
Approach Delay (s)	0.0	2.1	18.2				
Approach LOS			С				
Intersection Summary							
Average Delay			25				_
Intersection Canacity Litilize	ation		58.5%	IC		of Service	
Analysis Doriod (min)	uuUII		JU.J /0	IC	O LEVEL	J JEI VICE	
Analysis Penou (min)			15				

5:00 pm Baseline

Synchro 9 Report Page 2

5:00 pm Baseline

Lanes, Volumes, Tir 2: Strathearne Place	mings e & Ma	2022 Total PM Peak Hour.syr 12/11/2013					
	≯	-	Ļ	*	1	1	
ane Group	EBL	EBT	WBT	WBR	SBL	SBR	
ane Configurations		4	ef 🗧		Y		
Traffic Volume (vph)	7	4	13	30	15	0	
Future Volume (vph)	7	4	13	30	15	0	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							
Frt			0.905				
Flt Protected		0.968			0.950		
Satd. Flow (prot)	0	1860	1641	0	1825	0	
Flt Permitted		0.968			0.950		
Satd. Flow (perm)	0	1860	1641	0	1825	0	
_ink Speed (k/h)		50	50		50		
ink Distance (m)		247.0	147.1		197.6		
Travel Time (s)		17.8	10.6		14.2		
Confl. Peds. (#/hr)	5			5		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	0%	20%	0%	0%	0%	
Adj. Flow (vph)	8	4	14	33	16	0	
Shared Lane Traffic (%)							
ane Group Flow (vph)	0	12	47	0	16	0	
Enter Blocked Intersection	No	No	No	No	No	No	
ane Alignment	Left	Left	Left	Riaht	Left	Riaht	
Vedian Width(m)		0.0	0.0	<u> </u>	3.7	J .	
_ink Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.9	4.9		4.9		
Two way Left Turn Lane							
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24			14	24	14	
Sign Control		Free	Free		Stop		
ntersection Summary							
Area Type: C	Other						
Control Type: Unsignalized							
ntersection Capacity Utilizati	on 16.7%			IC	U Level	of Service A	
Analysis Doriod (min) 15							

2: Strathearne Plac	e & Ma	12/11/20					
	≯	-	-		1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		ų	ĥ		¥		
Traffic Volume (veh/h)	7	4	13	30	15	0	
Future Volume (Veh/h)	7	4	13	30	15	0	
Sian Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	8	4	14	33	16	0	
Pedestrians		1			5		
Lane Width (m)		3.7			3.7		
Walking Speed (m/s)		1.1			1.1		
Percent Blockage		0			0		
Right turn flare (veh)		-			-		
Median type		None	None				
Median storage veh)		None	None				
Linstream signal (m)							
nX platoon unblocked							
vC conflicting volume	52				56	36	
vC1_stage 1 conf vol	52				50	50	
vC1, stage 2 confivel							
vCu, unblocked vol	52				56	36	
tC single (s)	11				6.4	6.2	
tC 2 stago (s)	7.1				0.4	0.2	
tF (c)	2.2				3.5	2.2	
n) queue free %	00				0.0	100	
cM capacity (vob/b)	1550				90	1026	
	1009				940	1030	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume I otal	12	4/	16				
Volume Lett	8	0	16				
Volume Right	0	33	0				
cSH	1559	1700	948				
Volume to Capacity	0.01	0.03	0.02				
Queue Length 95th (m)	0.1	0.0	0.4				
Control Delay (s)	4.9	0.0	8.9				
Lane LOS	A		A				
Approach Delay (s)	4.9	0.0	8.9				
Approach LOS			А				
Intersection Summary							
Average Delay			2.7				
Intersection Capacity Utiliza	tion		16.7%	IC	U Level o	of Service	А
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

5:00 pm Baseline

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2022 Total PM Peak Hour.syn

5:00 pm Baseline

0		-	$\rightarrow$	1	+		1	- Ť.	1	1	÷.	-
ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
ane Configurations		\$			\$			4			4	
Fraffic Volume (vph)	5	0	16	0	0	0	20	100	0	0	244	24
uture Volume (vph)	5	0	16	0	0	0	20	100	0	0	244	24
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
ane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.896									0.988	
Flt Protected		0.989						0.992				
Satd, Flow (prot)	0	1702	0	0	1921	0	0	1875	0	0	1848	C
It Permitted		0.989						0.992				
Satd. Flow (perm)	0	1702	0	0	1921	0	0	1875	0	0	1848	0
ink Speed (k/h)		50			50			50			50	
ink Distance (m)		147.1			34.4			95.3			383.1	
Fravel Time (s)		10.6			2.5			6.9			27.6	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	3%	0%
Adj. Flow (vph)	5	0	17	0	0	0	22	109	0	0	265	26
Shared Lane Traffic (%)												
ane Group Flow (vph)	0	22	0	0	0	0	0	131	0	0	291	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
ane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Vedian Width(m)		0.0	5		0.0	5		0.0	5		0.0	5
_ink Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Furning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
ntersection Summary												
Area Type: O	ther											
Control Type: Unsignalized												
ntersection Capacity Utilization	on 32.4%			IC	Ulevelo	of Service	A					
and the second s												

Synchro 9 Report Page 5

HCM Unsignalized 3: Homestead Driv	Interse e & Stra	ction C athearn	apacit e Plac		2022 Total PM Peak Hour.syr 12/11/2013							
	≯	+	$\mathbf{F}$	4	+	*	•	1	1	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			÷			÷			\$	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	0	16	0	0	0	20	100	0	0	244	24
Future Volume (vph)	5	0	16	0	0	0	20	100	0	0	244	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	17	0	0	0	22	109	0	0	265	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	22	0	131	291								
Volume Left (vph)	5	0	22	0								
Volume Right (vph)	17	0	0	26								
Hadj (s)	-0.42	0.00	0.06	-0.01								
Departure Headway (s)	4.4	4.8	4.3	4.1								
Degree Utilization, x	0.03	0.00	0.16	0.33								
Capacity (veh/h)	741	684	817	873								
Control Delay (s)	7.5	7.8	8.1	9.1								
Approach Delay (s)	7.5	0.0	8.1	9.1								
Approach LOS	А	А	А	А								
Intersection Summary												
Delay			8.7									
Level of Service			А									
Intersection Capacity Utiliza	ition		32.4%	IC	U Level o	of Service			А			
Analysis Period (min)			15									

5:00 pm Baseline

Synchro 9 Report Page 6

5:00 pm Baseline







# Airport Road at Marion Street- 2022 Background Westbound Left Turn Lane Warrant (AM Peak)

80 Marion Street, Mount Hope – Transportation Brief 170310





# Airport Road at Marion Street - 2022 Background Westbound Left Turn Lane Warrant (PM Peak)

80 Marion Street, Mount Hope – Transportation Brief 170310





Airport Road at Marion Street- 2022 Total Westbound Left Turn Lane Warrant (AM Peak)

80 Marion Street, Mount Hope – Transportation Brief 170310





Airport Road at Marion Street- 2022 Total Westbound Left Turn Lane Warrant (PM Peak)

80 Marion Street, Mount Hope – Transportation Brief 170310





Strathearne Place at Marion Street- 2022 Total Eastbound Left Turn Lane Warrant (AM and PM Peak)

80 Marion Street, Mount Hope – Transportation Brief 170310